Merrychef

Version 3.0

Version 2.0

402s

SERVICE& PARTS MANUAL

This manual covers UK/EC models manufactured from:
Version 2.0 Serial No. 000745 –001199
Version 3.0 Serial No. 001200 onwards

ISSUE 5
23.09.2008

SERVICE MANUAL

CAUTION MICROWAVE EMISSIONS

DO NOT BECOME EXPOSED TO EMISSIONS FROM THE MICROWAVE GENERATOR OR PARTS CONDUCTING MICROWAVE ENERGY

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SAFETY CODE

This manual is designed to assist engineers who have been on a recognised product familiarisation and training course run by Merrychef. It has been prepared to offer technical guidance for the 402s range of Ovens.

Please remember that it is wiser **not** to attempt a service task if you are unsure of being able to complete it competently, quickly, and above all **safely**.

To avoid injury to yourself, and to protect the appliance from possible damage, please follow this Safety Code when servicing these ovens.

Before attempting to repair the oven, check it for microwave emission using a calibrated emission detector.

Check that the oven is not emitting microwaves, even when supposedly not in operation.

Check that the oven is not operating continuously, whether the display indicates cooking or not.

Always discharge the HT capacitors before working on the oven using a suitably insulated 10 MΩ Resistor.

When testing the oven with covers off run for short periods of time only or magnetrons will overheat and the display will show Error condition.

Before removing any covers from the oven, do all of the following.

- Switch off the mains supply and remove the plug from the wall socket.
  or
- If the oven is hard wired, ensure that the power is turned off at the isolator switch.

Note:

The On/Off switch on the oven is **not** adequate protection against electric shock, as it does not isolate all of the internal wiring from the mains.

Upon completion of a service the oven, or before reconnecting the appliance to the electrical supply for testing, check all of the following points:

- All internal electrical connections are correct (see wiring diagram).
- All wiring insulation is correct and is not touching a sharp edge.
- All grounding connections are electrically and mechanically secure.
- All door safety interlocks are secure and mechanically sound.
- The door operation is smooth, and the arms run freely in the slots.
- The door activates all four of the door interlock switches and **in the correct order**
- The temperature sensor is correctly connected to the Power PCB.

Before finishing a service call, recheck the following points:

- All of the electronics are functioning correctly and all of the touch pads are working.
- Microwave emissions are below permissible limit of 5 mW/cm².
- The power output of the oven is checked in accordance with the procedure page.
- Oven has correct 50mm (2 inches) air gap all round and 50mm (2 inches) above. Air flow should not be restricted.

PRODUCT SPECIFICATIONS

Serial Number (Rating Plate):

Month **00/** Year **00/** Production number **00000**

e.g **01 08 03349** Oven manufactured **January, 2008**, production number **03349**

Model Number: 402S VVV F P C R TT ZZ

Example 402S2205BK2GMEU
Model No. EC402s
220V, 50Hz, L1 +L2 +N +Earth supply, MenuKey Revision 1, General Market, EU

Supply Voltage	Freq. Hz	Phase/Supply	Control Type	Version	Type	Country /Region
VVV	F	P	C	R	TT	ZZ
Voltage (ac) **208** = 208V **220** = 220-230V **240** = 230-240V	**5** = 50Hz **6** = 60Hz	Phase Arrangement **A** = L + N + E (30 Amp) **B** = L1 + L2 + N + E **C** = 2 P + Gnd (20 Amps) **D** = 2 P + Gnd (30 Amps)	**K** = Electronic MenuKey	**1** **2** **3**	**GM** = General Market	**UK** = United Kingdom **US** = USA **EU** = Europe

Power Requirement		See Rating Label
Power Output	Microwave 100% Convection	1500watts 3250watts
External Dimensions	Height Width Depth	595mm (23.0 inches) 585mm (23.0 inches) 700mm (27.5 inches)
Weight	Nett	90kg (198lb.s)
Construction	Cavity Casework	304 Stainless Steel

INSTALLATION INSTRUCTIONS

Installation Instructions for Mealstream 402s Ovens

Power Supply Requirements
The Mealstream 402s should be connected to a suitable electricity supply, which can cope with the switching-on surge that occurs with certain types of catering equipment, including microwaves. Because of this requirement, we strongly recommend that a separate, suitably rated supply is installed for the oven.

The supply for the oven should be fitted with a **Type "C"** or **Time Delay circuit breaker**.

If the oven is hard-wired to the supply, a double-pole isolator switch with a contact gap of at least 3mm (1/8 inch) should be fitted.

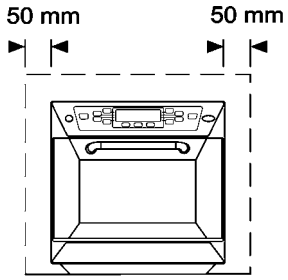
Earth Bond terminal
An Earth Bond Terminal is provided on the rear panel of the oven for independent Earth (GND) connection.

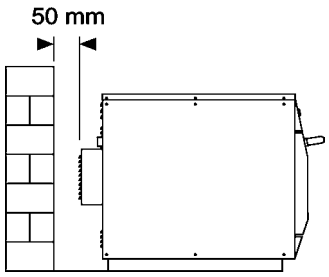
Grounding requirement
This appliance must be connected to a grounded, metallic, permanent wiring system, or an equipment grounding conductor should be run with the circuit conductors and connected to the equipment grounding terminal or lead on the appliance.

Positioning the Oven

In order to maintain adequate ventilation for air intake and exhaust, and to allow access for cleaning filters, you must allow a minimum of 50 mm (2 inches) clearance at the sides and rear of the oven.

Air intake temperature should not exceed 45°C (110°F) excessive temperature will lead to reduced operating duty cycle, or premature ageing of internal components. Failure to comply with these conditions will invalidate the warranty.





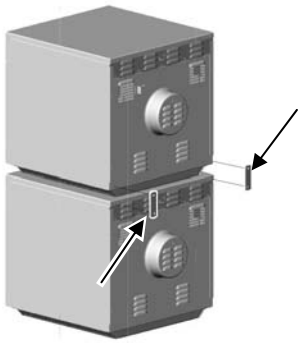
Note:
The minimum recommended clearance required for air flow

NEVER Install an oven above fryers, grills, griddles or any other major heat source.

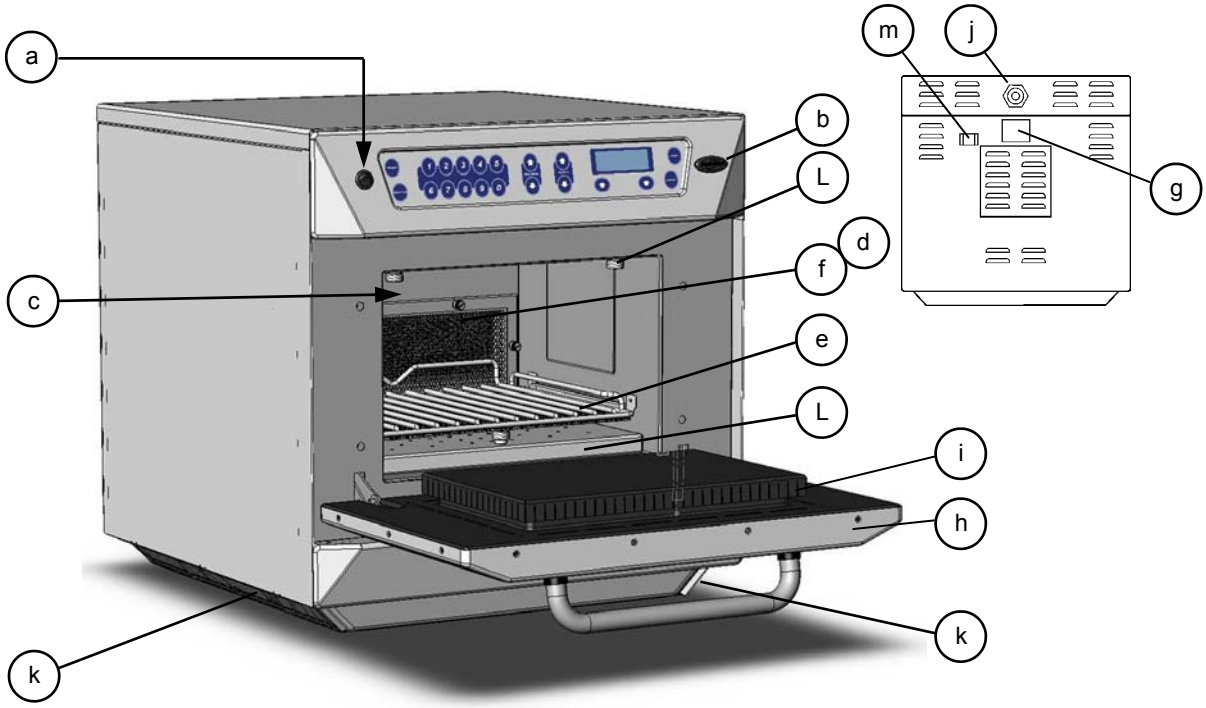
ALWAYS Place containers in the cavity carefully - impact damage may chip the vitreous enamel coating on the runners and baffle plate.

Stacking the oven (Maximum one only)

Using stacking kit Part No. SA129



MAIN FEATURES



a On/Off SWITCH

This is used to turn the oven On or Off.

IT DOES NOT ISOLATE INTERNAL WIRING FROM THE MAINS SUPPLY.

b MenuKey

The MenuKey System automatically changes all the cooking programs with an electronic key and allows program names to be identified.

c OVEN CAVITY

The oven cavity is mainly constructed from stainless steel panels. It must be kept clean.

d GREASE FILTER

The grease filter must be cleaned on a regular basis, and kept free of debris.

e RACK

The cooking rack should be removed daily and cleaned

f HOT AIR FAN

Situated behind the grease filter and circulates the hot air through the cavity.

g RATING PLATE

The rating plate is situated on the rear of the oven, and states the Model, Serial Number, Electrical Ratings and Manufacturers telephone number.

h DOOR

The door consists of a thermally insulated inner section, and an additional air gap provided by a twin skinned door front to lower the surface temperature.

i DOOR SEAL

These ensure a tight seal around the door. They should be kept clean and checked regularly for signs of damage. Replace if worn or damaged.

j ELECTRICAL SUPPLY CORD

Electrical supply cord is situated on the rear of the oven,

k AIR FILTERS

Main intake for cooling air for internal components. Must be clear of obstructions.

L IMPINGER PLATES (Upper & Lower)

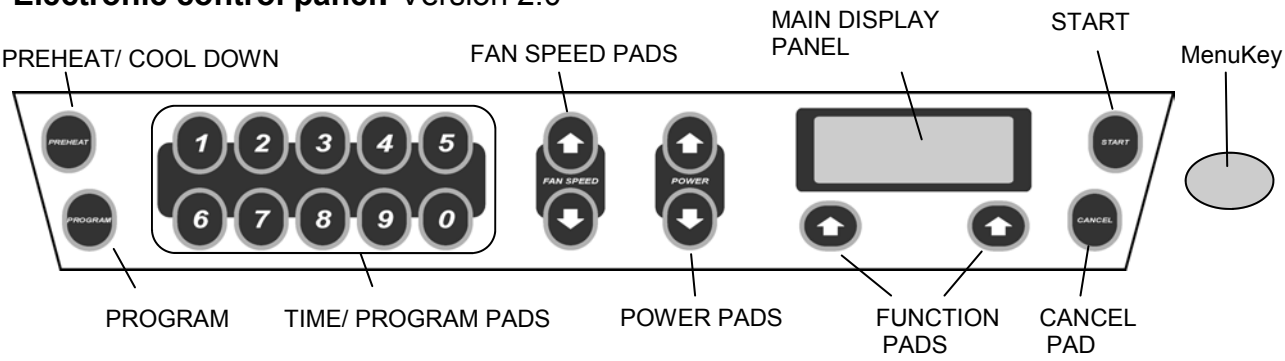
Direct the air in the cavity. They must be cleaned on a regular basis, and kept free of debris

m STEAM VENT PIPE

Vents steam from the oven cavity

MAIN FEATURES

Electronic control panel: Version 2.0



CANCEL PAD
Cancels all timed cooking cycles, pre-programmed operations and stops the microwave energy. It does not alter the oven temperature. If the oven is hot, food will continue to cook and should be removed from the oven immediately. This pad will also cancel any incorrect operations. It will not erase programs.

FAN SPEED PADS
The Fan speed can be increased and decreased in 5% steps (10% to 100%)

FUNCTION PADS
Move through control functions in the Main Display

MAIN DISPLAY PANEL
Shows the principal functions of the oven.
When cooking, the time remaining counts down.
Also displays error messages and oven temperature. (See TROUBLESHOOTING)
When storing and recalling a program the display indicates the program number and details

MenuKey
The MenuKey System automatically changes all the cooking programs with an electronic key and allows program names to be identified.

POWER PADS
The microwave power can be increased or decreased adjusted in 10% steps. (0% to 100%)
The default setting is 50% microwave power.

PREHEAT/ COOL DOWN
Commences main oven heating cycle to a preset temperature. Press and hold for 5 seconds to commence cool down procedure (See CLEANING)

PROGRAM
Activates program mode for storing programs in memory START PAD Commences a program

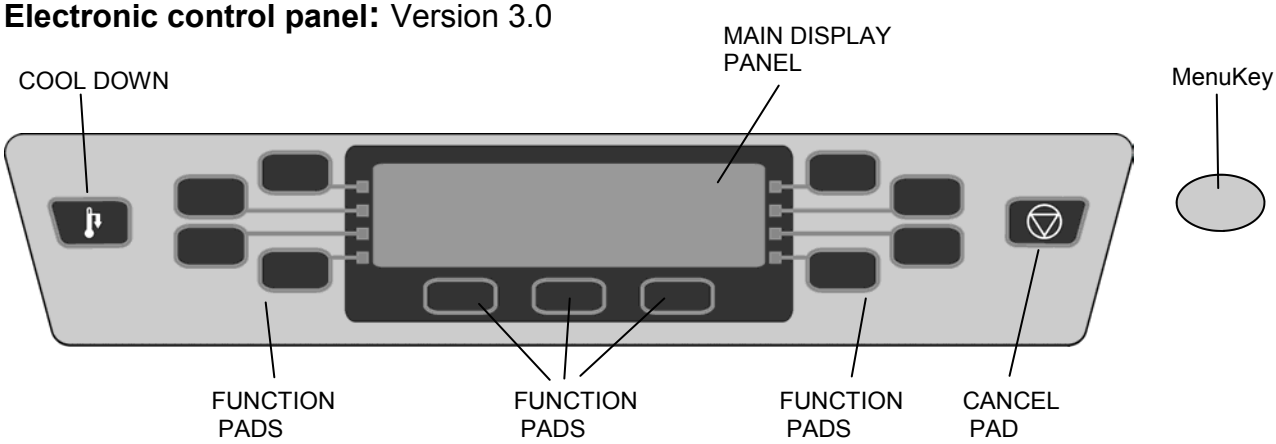
TIME/ PROGRAM PADS
These pads are used for setting the cooking time in 1 second steps to a maximum of 10 minutes.
They are also used for storing and recalling programs from 0-499

Display Panel error messages

Message	Condition	Possible cause
ERROR MAGNETRON 1	Magnetron 1 has overheated	Blocked Air filter(s) Oven located near hot air sources Oven being used empty Cooling fan failure Magnetron failure
ERROR MAGNETRON 2	Magnetron 2 has overheated	
ERROR MAGNETRON 1 & 2	Magnetron 1 and 2 have overheated	
CAVITY SENSOR ERROR	Cavity temperature exceeds more than 50°C above PREHEAT temperature setting during cook cycle	Indicates combustion (fire) in oven cavity Note: In service operations when PREHEAT is set to 0°C this message can appear when the oven is operated

MAIN FEATURES

Electronic control panel: Version 3.0



MenuKey 2
The MenuKey System automatically changes all the cooking programs with an electronic key and allows program names to be identified

CANCEL PAD
Cancels all timed cooking cycles, pre-programmed operations and stops the microwave energy. It does not alter the oven temperature. If the oven is hot, food will continue to cook and should be removed from the oven immediately. This pad will also cancel any incorrect operations. It will not erase programs.

DISPLAY PANEL
Shows the principal functions of the oven. When cooking, the time remaining counts down. Also displays error messages and oven temperature. When storing and recalling a program the display indicates the program number and details.

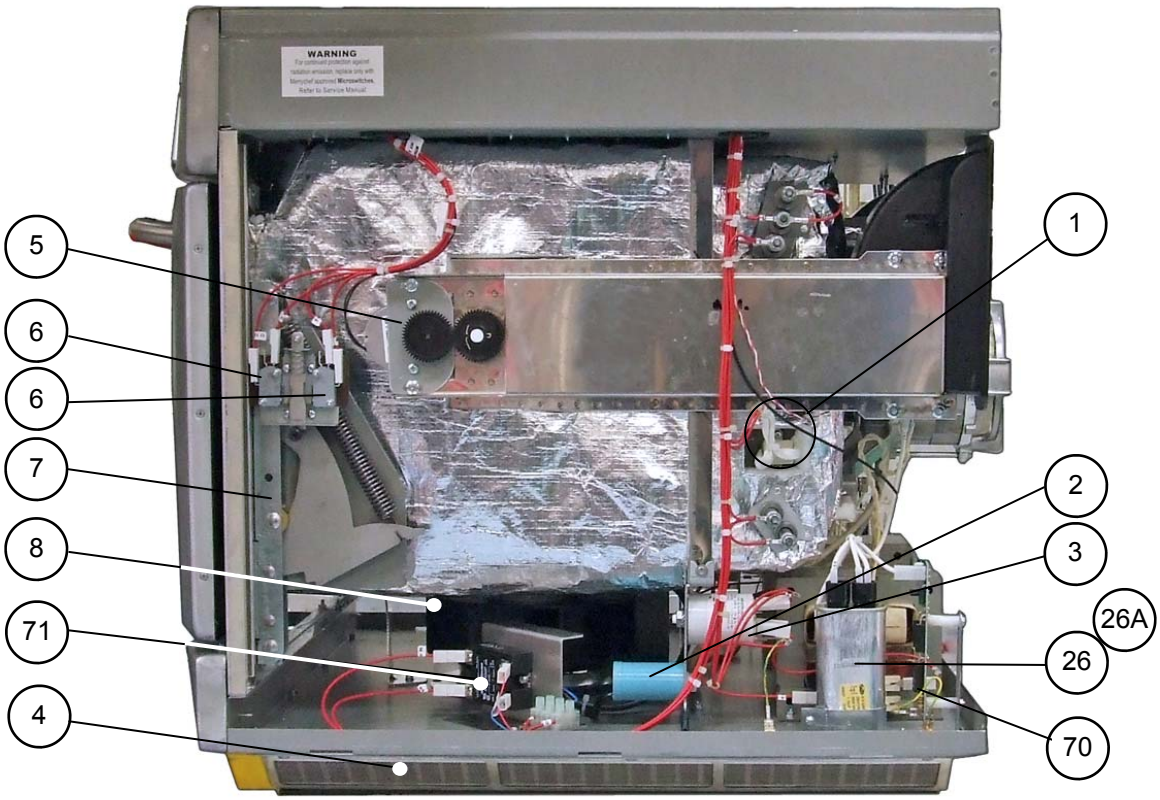
FUNCTION PADS
The function pads select options shown in the DISPLAY PANEL.

COOL DOWN PAD
Puts the oven into Cool Down Mode prior to cleaning

Display Panel error messages

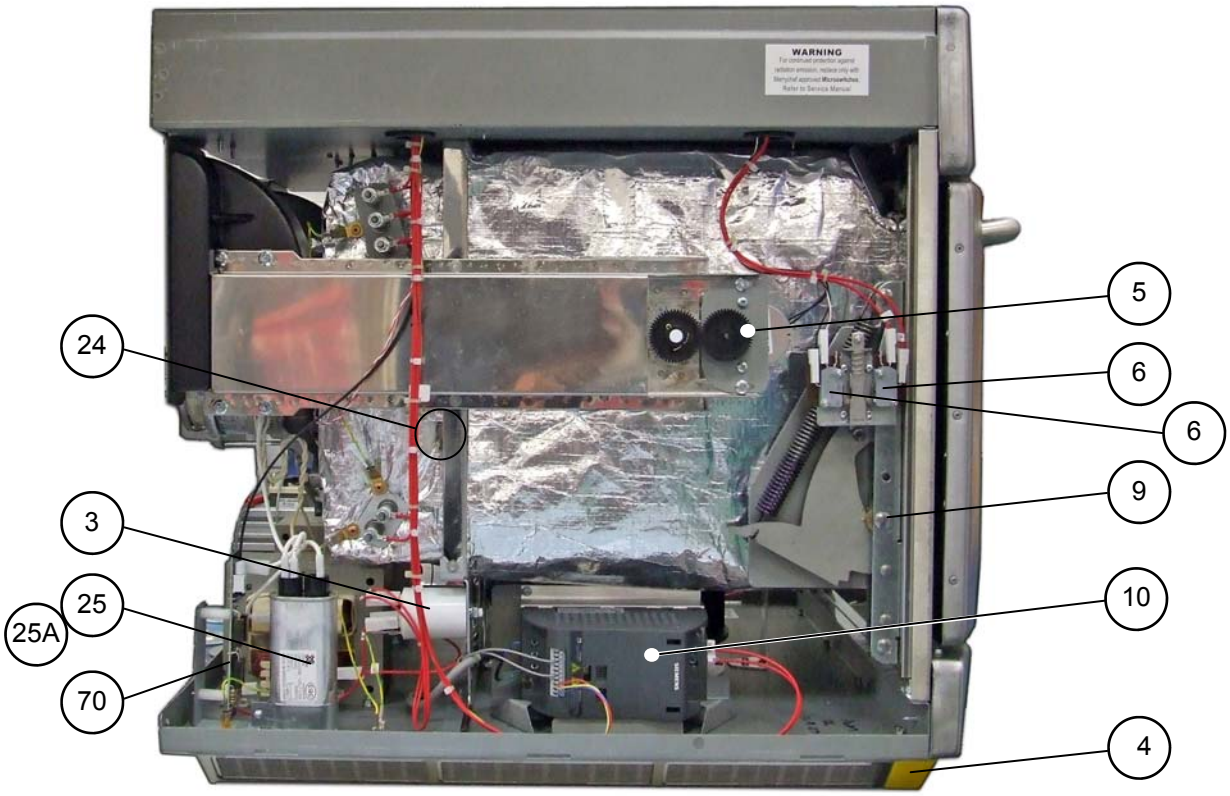
Error Message	Condition	Possible Cause
Magnetron 1 Overheat Ensure air filters are clean Allow oven to cool	Magnetron 1 has overheated	Blocked air filters Oven located near hot air source Oven being used empty Cooling fan failure Magnetron failure
Magnetron 2 Overheat Ensure air filters are clean Allow oven to cool	Magnetron 2 has overheated	
Magnetron 1 & 2 Overheat Ensure air filters are clean Allow oven to cool	Magnetron 1 & 2 have overheated	
Magnetron 1 Failure	Magnetron 1 no microwave output	Check power supply Magnetron failure
Magnetron 2 Failure	Magnetron 2 no microwave output	
Magnetron 1 & 2 Failure	Magnetron 1 & 2 no microwave output	
Ambient Overheat Ensure air filters are clean Allow oven to cool	Temperature inside casing has exceeded limit	Blocked air filters Restricted airflow to air filters Oven located near hot air source Circulation fan failure Combustion (fire) in cavity
Cavity Overheat Please contact service	Cavity temperature has exceeded more than 295°C	Blocked air filters Restricted airflow to air filters Combustion (fire) in cavity
Heater Failure	Cavity has not reached a temperature of 100°C in 10 minutes	One or more heater elements have failed and need to be replaced

PRINCIPAL COMPONENTS: Right Side



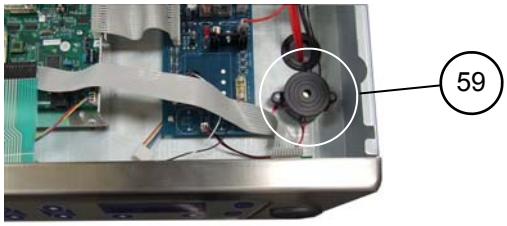
No.	Description	Part No.
1	Cavity Overheat stat	30Z1024
2	Motor Start Capacitor 2µF (Blue)	30Z1298
3	Filter 16A (Threaded)	30Z1340
4	Air filter	SA276
5	Stirrer motor Assembly	SA288
6	Microswitch SW1 Microswitch SW2	30Z1294
7	Door Hinge Assembly RH	SA202
8	Magnetron Cooling Fan	30Z1295
26	HV Capacitor 2500V 1.1µF (50HZ models)	30Z1242
26	HV Capacitor 2500V 0.88µF (60HZ models)	30Z1251
26A	HV Capacitor universal clip	31Z1261
70	Fibre Optic PCB	11M0364
71	Solid State Relay	30Z1362

PRINCIPAL COMPONENTS: Left Side



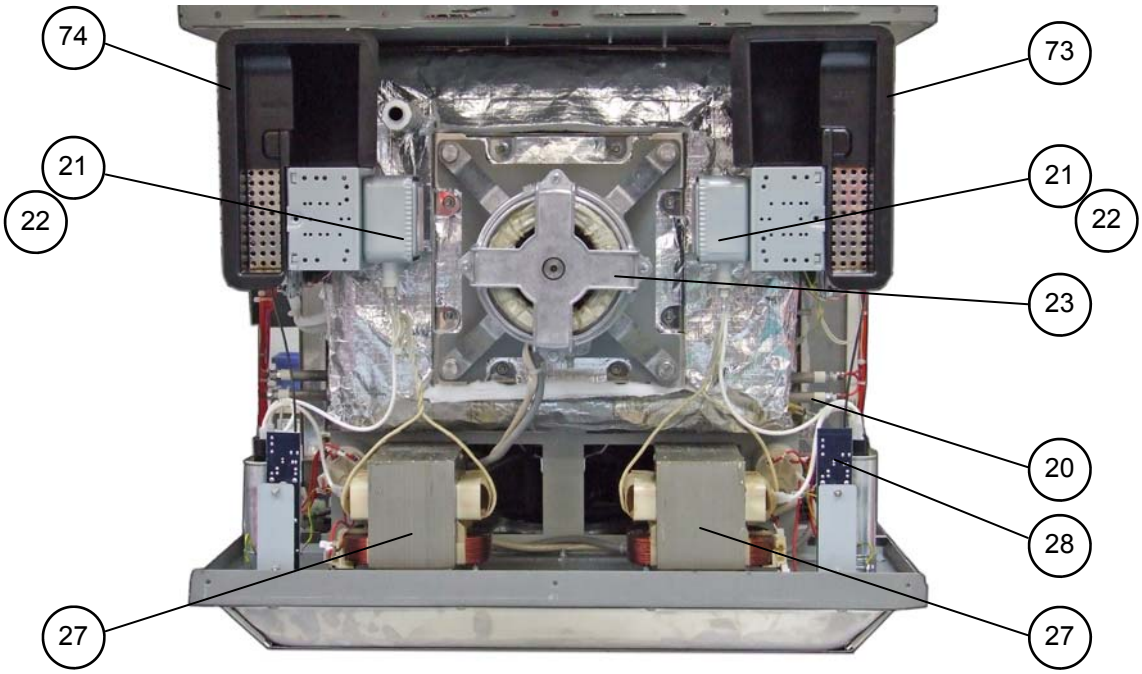
No.	Description	Part No.
3	Filter 16A (Threaded)	30Z1340
4	Air filter	SA276
5	Stirrer motor Assembly	SA288
6	Microswitch SW3 Microswitch SW4	30Z1294
9	Door Hinge Assembly LH	SA203
10	Motor Controller	30Z1319
24	Thermistor Cavity	30Z1315
25	HV Capacitor 2500V 1.0µF (50Hz models)	30Z1331
25	HV Capacitor 2500V 0.88µF (60Hz models)	30Z1251
25A	HV Capacitor clip	31Z1261
70	Fibre Optic PCB	11M0364

PRINCIPAL COMPONENTS: Control Box

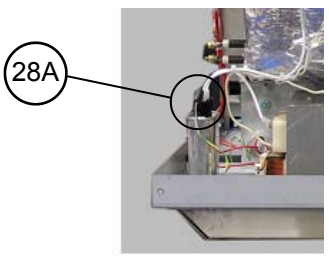


No.	Description	Part No.
11	Fuse 10A HRC	30Z0217
12	Gold resistor (220R)	30Z0235
13	Relay PCB Assembly	11K0004
14	Ribbon Cable 15way	11Z0298
15	Ribbon Cable 10way MenuKey	11M0117
16	Logic PCB Assembly Version 2.0	11K0002
16	Logic PCB Assembly Version 3.0	11K0012
17	Transformer LT (Low voltage)	30Z1155
18	Fuse 1A	30Z0957
59	Sounder	SA257
72	Fibre Optic Logic PCB	11K0013

PRINCIPAL COMPONENTS: Back view

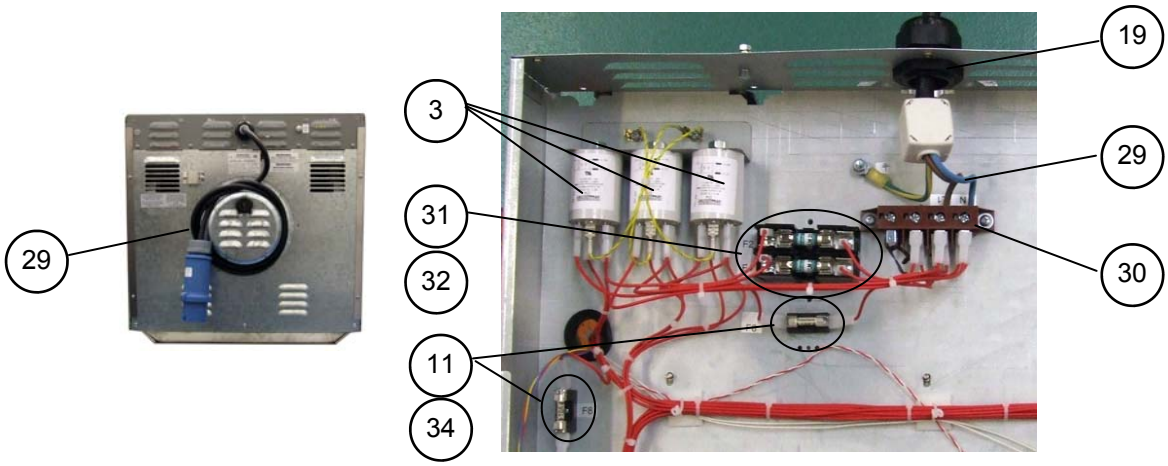


No.	Description	Part No.
20	Heater Element **220V** 650W	DV0606
20	Heater Element **240V** 650W	DV0607
21	Magnetron (Toshiba)	30Z1349
22	Magnetron Thermistor Assembly	SA234
23	Convection (Hot Air) Motor Assembly	SA208
27	Transformer 208/220/240V **50Hz**	30Z1233
27	Transformer 208/220/240V **60Hz**	30Z1230
28	HT Diode Assy PCB (Fibre Optic)	11H0364
28A	HT Diode Assembly (Non-optic)	11H0010
73	Magnetron Cooling Duct LH	DV0039
74	Magnetron Cooling Duct RH	DV0040

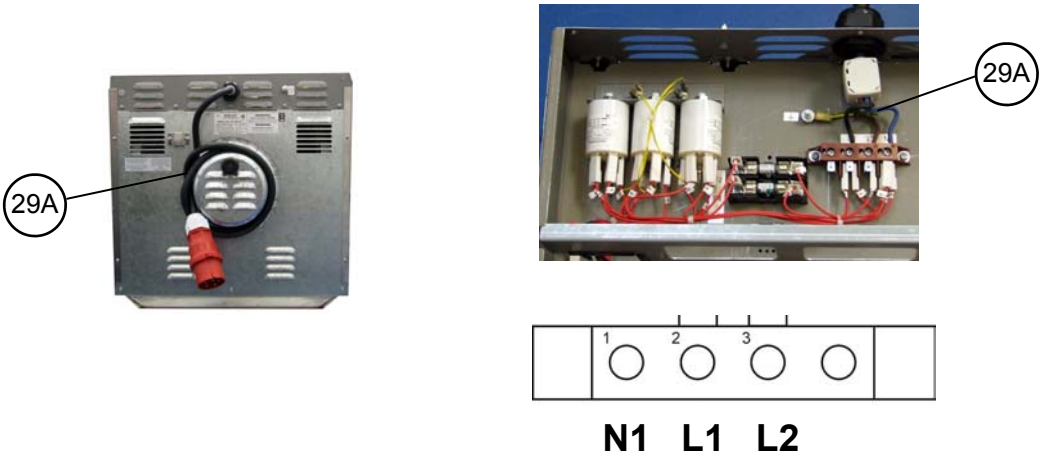


PRINCIPAL COMPONENTS: Power Supply

Electrical Supply: Single Phase



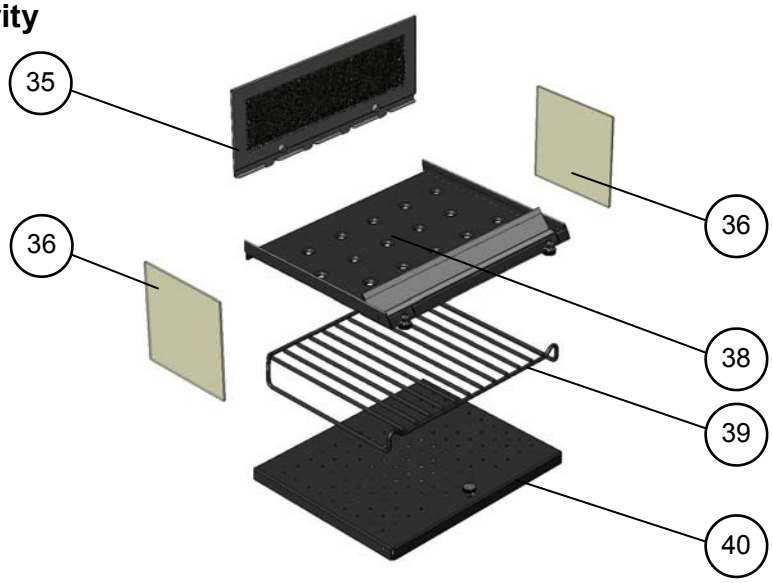
Electrical Supply: Twin phase
2P+N+Earth



No.	Description	Part No.
3	Filter 16A	30Z1340
11	Fuse 10A HRC	30Z0217
19	Cable Gland	31Z0500
	Cable Gland Nut	31Z0499
29	Electrical Supply Lead Assembly Single Phase	SA226
29A	Electrical Supply Lead Assembly Twin Phase	SA225
30	Terminal Block	31Z0447
31	Fuse 20A FLM	30Z1177
32	Fuse Holder 30A	30Z1178
34	Fuse Holder 10A	30Z0231

PRINCIPAL COMPONENTS

Cavity

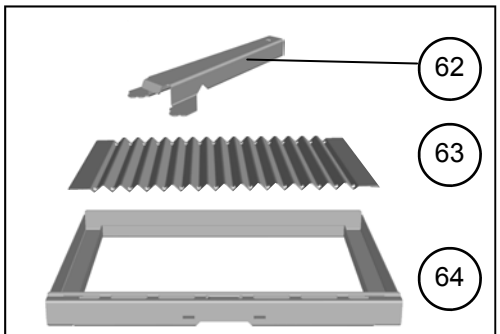


Stirrer glass
Shown removed

No.	Description	Part No.
5A	Stirrer (behind stirrer glass)	SA291
35*	Grease Filter (2 parts)	SA340 SA339
36	Stirrer Glass	DV0492
37*	Rack Support (Not shown)	DV0114
38	Upper Impinger plate	SA211
39	Rack	DV0275
40	Lower Impinger plate	SA266

* Parts 35 & 37 Contact Service Department

KFC Accessories

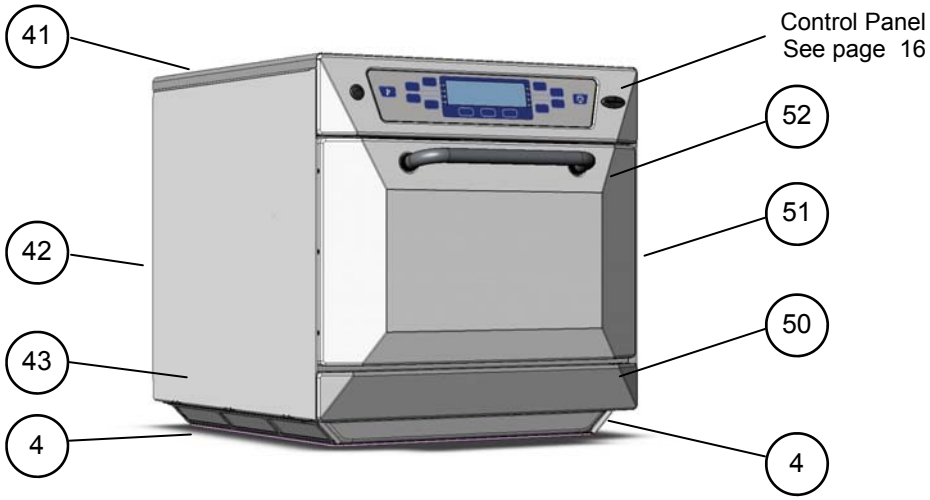


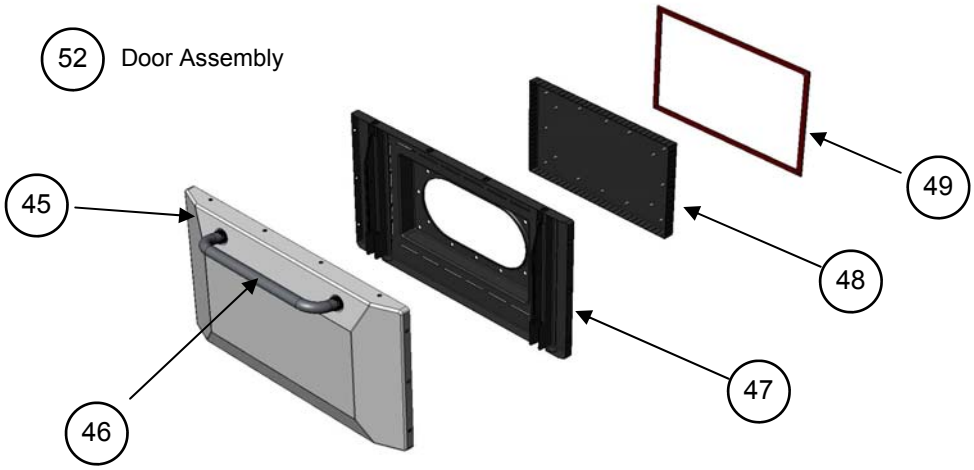
65 Chicken Griddle SA133

No.	Description	Part No.
60	Cool-down pan	32Z4028
61	Oven tray	MC3175
62	Handle Assembly	SA267
63	Griddle	DV0221
64	Griddle carrier	SA350
65	Chicken Griddle (SA350 + DV0221 + DV0267)	SA133

PRINCIPAL COMPONENTS

External Parts



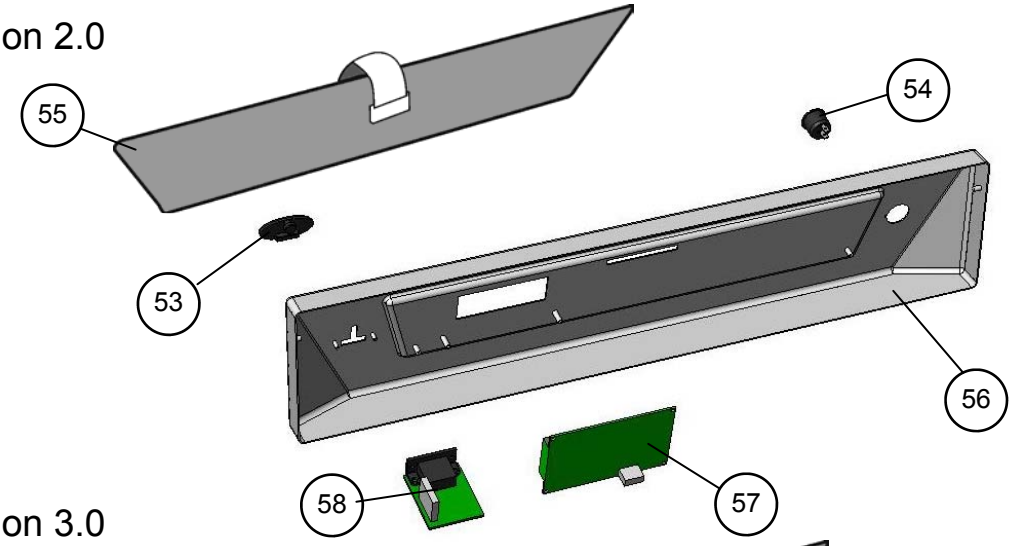


No.	Description	Part No.
4	Air Filter	SA276
41	Top Panel	DV0187
42	Rear Panel	SA329
43	Side Panel LH	DV0091
45	Door Skin	DV0501
46	Door Handle	32Z1066
47	Door Inner	SA331
48	Door Choke	DV0168
49	Door Seal (wide)	DV0305
	Door seal sealant (tube)	31Z0186
50	Bottom Trim	DV0037
51	Side Panel RH	DV0092
52	Door Assembly	SA111

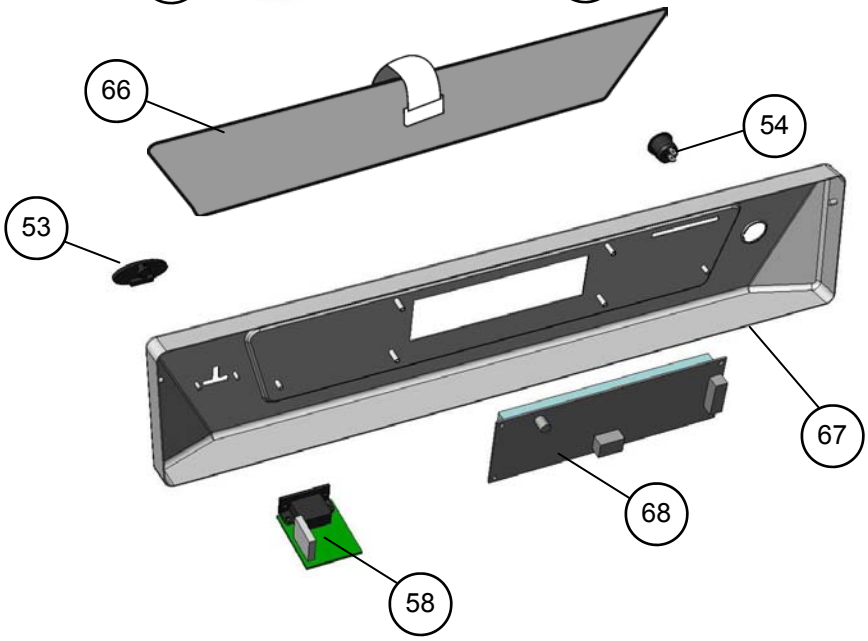
PRINCIPAL COMPONENTS

Electronic Control Panel Assembly

Version 2.0



Version 3.0



No.	Description	Part No.
53	MenuKey Dust Cover	DV0052
54	Power switch (On/Off)	30Z1318
55	GM Membrane Version 2.0	DV0055
56	Front Panel Version 2.0	DV0036
57	Display Assembly & Header Version 2.0	30Z1299
58	MenuKey Socket	11K0005
66	GM Membrane Version 3.0	DV0254
67	Front Panel Version 3.0	DV0249
68	Display Assembly & Header Version 3.0	30Z1324

Part number identification chart 1

Ref. No.	Description	Part No.
1	Cavity High limit Stat	30Z1024
2	Motor Start Capacitor 2µF (Blue)	30Z1298
3	Filter 16A	30Z1340
4	Air filter	SA276
5	Stirrer motor Assembly	SA288
5A	Stirrer (inside cavity)	SA213
6	Microswitch SW1, SW2, SW3, SW4	30Z1294
7	Door Hinge Assembly RH	SA202
8	Magnetron Cooling Fan	30Z1295
9	Door Hinge Assembly LH	SA203
10	Motor Controller	30Z1319
11	Fuse 10A HRC	30Z0217
12	Gold resistor (220R)	30Z0235
13	Relay PCB Assembly	11K0004
14	Ribbon Cable 15way	11Z0298
15	Ribbon Cable 10way MenuKey	11M0117
16	Logic PCB Version 2.0/ 2.5	11K0002
16	Logic PCB Assembly Version 3.0	11K0012
17	Transformer LT (Low voltage)	30Z1155
18	Fuse 1A	30Z0957
19	Cable Gland	31Z0500
	Cable Gland Nut	31Z0499
20	Heater Element **220V** 650W	DV0606
	Heater Element **240V** 650W	DV0607
21	Magnetron (Toshiba)	30Z1349
22	Magnetron Thermistor Assembly	SA234
23	Convection (Hot Air) Motor Assembly	SA208
24	Thermistor Cavity	30Z1315
25	HV Capacitor 2500V 1.0µF (**50Hz** Models)	30Z1331
25	HV Capacitor 2500V 0.88µF (**60Hz** Models)	30Z1251
25A	HV Capacitor clip universal	31Z1261
26	HV Capacitor 2500V 1.1µF (**50Hz** Models)	30Z1242
26A	HV Capacitor clip universal	31Z1261
27	Transformer 208/220/240V **50Hz**	30Z1233
27	Transformer 208/220/240V **60Hz**	30Z1230
28	HT Diode Assy	11H0010
29	Electrical Supply Lead Assembly	SA226
29A	Electrical Supply Lead Assembly Twin Phase	SA225
30	Terminal Block	31Z0447
31	Fuse 20A FLM	30Z1177

Part number identification chart 2

Ref. No.	Description	Part No.
32	Fuse Holder 30A	30Z1178
34	Fuse Holder 10A	30Z0231
35	Grease Filter (2 parts)	SA339 SA340
36	Stirrer Glass	DV0492
37	Rack Support	DV0114
38	Upper Impinger plate	SA211
39	Rack	DV0275
40	Lower Impinger plate	SA266
41	Top Trim	DV0187
42	Rear Panel	SA329
43	Side Panel LH	DV0091
45	Door Skin	DV0501
46	Door Handle	32Z1066
47	Door Inner	SA331
48	Door Choke	DV0168
49	Door Seal (wide)	DV0305
50	Bottom Trim	DV0037
51	Side Panel RH	DV0092
52	Door Assembly	SA111
53	MenuKey Dust Cover	DV0052
54	Power switch (On/Off)	30Z1318
55	Membrane GM Version Version 2.0	DV0055
56	Front Panel Version 2.0	DV0036
57	Display Assembly & Header Version 2.0	30Z1299
58	MenuKey Socket	11K0005
59	Sounder	SA257
60	Cool-down pan	32Z4028

Ref. No.	Description	Part No.
61	Oven tray	MC3175
62	Handle Assembly	SA267
63	Griddle	DV0221
64	Griddle carrier	SA350
65	Chicken Griddle (SA350+DV0221+ DV0267)	SA133
66	GM Membrane Version 3.0	DV0254
67	Front Panel Version 3.0	DV0249
68	Display Assembly Header Version 3.0	30Z1324
70	Diode Assembly	11M0364
71	Solid State Relay	30Z1632
72	Fibre Optic Logic PCB	11K0013
73	Magnetron Cooling Duct LH	DV0039
74	Magnetron Cooling Duct RH	DV0040
—	Door seal sealant (tube)	31Z0186
—	Stirrer cover sealant (tube)	31Z0527
—	Grease Filter Cartridge	SA340
—	Microswitch interlock Spring	31Z1247

PROCEDURE FOR POWER OUTPUT MEASUREMENT

The power output specification 1500W on this model is established under IEC 705 standard method. This method is only workable in Laboratory controlled conditions.

An approximate method is as follows:

Ensure the oven is cold before commencing the test

Before this test is carried out the oven PREHEAT temperature must be set to 0ºC as this enables the oven to be used in Microwave ONLY mode. On completing the test the Oven PREHEAT temperature should be restored to its previous setting.

EC402s Version 2.0 To set the PREHEAT temperature to 0ºC

1. Switch the oven on and immediately press the **Edit Preheat** function key, the ENTER PREHEAT TEMP screen will display (Note this screen is available for 5 seconds)
2. The oven display shows the current PREHEAT setting, make a note of this temperature
3. Enter **0**,**0**,**0** for 0ºC and press **Save**.
4. The display will now show the initial Edit Preheat/Profile screen for 10 seconds then the cold standby screen.
   Press the **PREHEAT** pad, the oven will not preheat but the READY TO COOK screen will appear in the display.

EC402s Version 3.0 To set the PREHEAT temperature to 0ºC

1. Switch the oven on and immediately press the **Edit Preheat Temp** function key, the OVEN TEMPERATURE screen will display (Note this screen is available for 5 seconds)
2. The oven display shows the current PREHEAT setting, make a note of this temperature
3. Hold down the **<< —** for **0ºC** and press **Save**.
4. The Categories screen will appear in the display.

Test procedure:

1. Fill one beaker (glass or plastic) with one litre (1.78 pints) of tap water at about 20ºC(68ºF) and measure the water temperature.
   (Use a thermometer with a $^{1}/_{10}$, 0.1 degree gauge).

2. Place the beaker in the centre of the cold cavity.

3. Version 2.0 Press the Manual Function Pad to enter **Manual Mode**
   Version 3.0 Press the lower RH function pad below the display to enter **Manual Mode**
   Set **Time** to 1 minute 3 seconds, Power to 100% and Fan to 10%.
   Press the **Start** pad and wait until the counter reaches zero.

4. Take the beaker out immediately stir the water with a plastic implement and measure the water temperature.

Calculate the temperature rise of water in the beaker.
The temperature rise of the water should be within the following range:

Temperature **Rise**
15ºC (27ºF) Minimum
20ºC (36ºF) Maximum

Manual Mode:
If this screen does not appear MANUAL MODE is set to OFF and must be changed to ON in the oven PROFILE.

Version 3.0
Switch Oven OFF then ON and immediately press the lower of the 4 pads on the RHS of the display. In OVEN PROFILE change **Manual Mode** to ON

Version 2.0
Switch Oven OFF then ON and immediately press the **Profile** pad. Press change to set OVEN MODE to PROGRAM/MANUAL

Note:
Power Output is affected by the line voltage under load.
For correct Power Output measurement the line voltage under load must be correct.

PROCEDURES FOR PRINCIPAL COMPONENTS TEST (1)

1. Power Transformer Test

You will need:

A Digital Multi-meter (D.M.M.)
A Megger or similar resistance meter using 500V d.c.

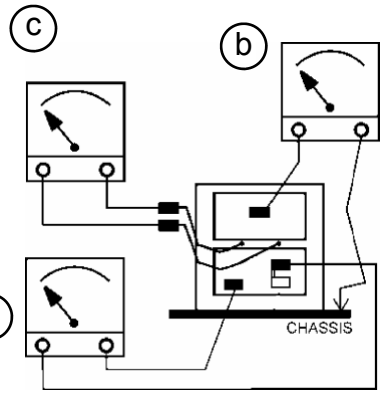
WARNING: High voltages and large currents are present at the High Voltage Capacitor. It is very dangerous to work near this part when the oven is on. **NEVER** make any voltage measurements at the High Voltage circuits, including the magnetron filament.

WARNING: Even when the oven is not cooking, the High Voltage Capacitor has High Voltages present because of the Soft Start circuit. Isolate the oven before testing.

See Safety Code (Page 3)

1 Isolate the oven from the mains supply.
2 Ensure that the High Voltage Capacitor is discharged before commencing work.
3 Remove all connections from the Power Transformer.
4 Using a D.M.M., check the resistance of the windings. Results should be as follows:

a	Mains winding between tags	Approx. 1.1 Ω
b	High Voltage winding	Approx. 60 Ω
c	Filament winding between terminals	Less than 1 Ω



5 Using a Megger, test the insulation resistance between:

Primary winding and chassis	Pass if over 10 MΩ
Filament winding and chassis	Pass if over 10 MΩ

One end of the High Voltage winding is connected to the chassis, so this is not tested.

2. High Voltage Capacitor Test

You will need:

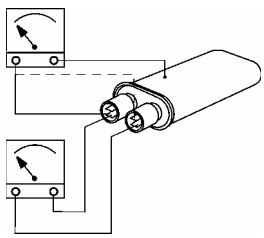
A Digital Multi-meter (D.M.M.)
A Megger or similar resistance meter using 500V d.c.

WARNING: High voltages and large currents are present at the High Voltage Capacitor. It is very dangerous to work near this part when the oven is on. **NEVER** make any voltage measurements at the High Voltage circuits, including the magnetron filament.

WARNING: Even when the oven is not cooking, the High Voltage Capacitor has High Voltages present because of the Soft Start circuit. Isolate the oven before testing.

See Safety Code (Page 3)

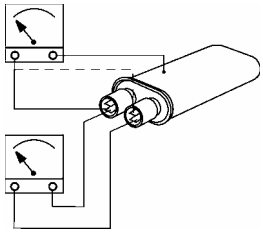
1. Isolate the oven from the mains supply.
2. Ensure that the High Voltage Capacitor is discharged before commencing work.
3. Remove all connections from the High Voltage Capacitor.
4. Using a D.M.M., check for continuity between the terminals & compare results with table on next page.



PROCEDURES FOR PRINCIPAL COMPONENTS TEST (2)

(High Voltage Capacitor Test continued, ensure steps 1-4 on previous page have been completed)

Between Terminals	Pass if approximately 10 MΩ
Between Terminals and Case	Pass if open circuit



5. Using a Megger, test the insulation resistance between the terminals and the case.

Between Terminals and Case	Pass if over 100 MΩ

3. High Voltage Rectifier Test

You will need:

A Megger or similar resistance meter using 500V d.c.

WARNING: High voltages and large currents are present at the High Voltage Capacitor. It is very dangerous to work near this part when the oven is on. **NEVER** make any voltage measurements at the High Voltage circuits, including the magnetron filament.

WARNING: Even when the oven is not cooking, the High Voltage Capacitor has High Voltages present because of the Soft Start circuit. Isolate the oven before testing.

See Safety Code (Page 3)

1. Isolate the oven from the mains supply.
2. Ensure that the High Voltage Capacitor is discharged before commencing work.
3. Remove all connections from the High Voltage Rectifier.
4. Using the Megger, test for continuity in both directions. Compare results with the table.

Open Circuit both ways	**FAIL**
Conducts one way only	**PASS**
Short Circuit both ways	**FAIL**
Conducts one way, leaks the other	**FAIL**

4. Magnetron Test

You will need:

A Megger or similar resistance meter using 500V d.c.

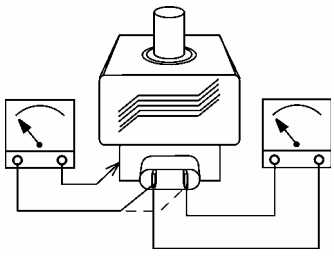
A Magnetron can be tested for an open filament or a short circuit by carrying out a continuity check.

WARNING: High voltages and large currents are present at the High Voltage Capacitor. It is very dangerous to work near this part when the oven is on. **NEVER** make any voltage measurements at the High Voltage circuits, including the magnetron filament.

WARNING: Even when the oven is not cooking, the High Voltage Capacitor has High Voltages present because of the Soft Start circuit. Isolate the oven before testing.

See Safety Code (Page 3)

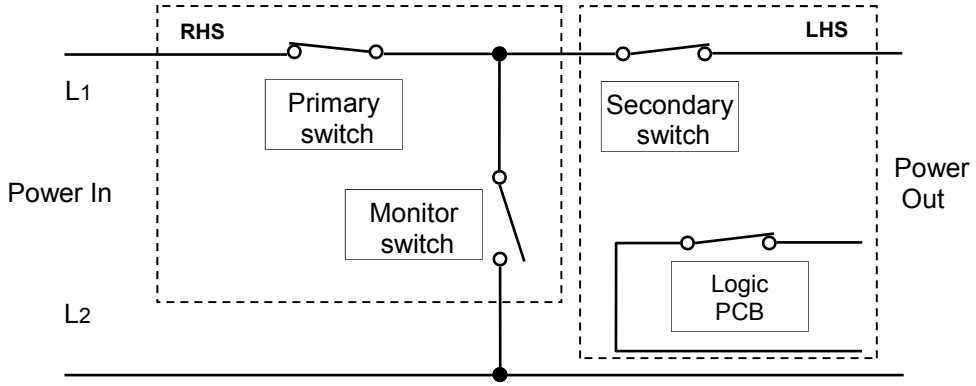
1. Isolate the oven from the mains supply.
2. Ensure that the High Voltage Capacitor is discharged before commencing work.
3. Remove all connections from the Magnetron.
4. A continuity check across the Filament terminals should be 1ohm or less
5. A continuity check between each filament terminal and the metal outer should read open.



PROCEDURE FOR DOOR INTERLOCK ADJUSTMENT AND TEST 1

The door on the 402s oven is monitored by four microswitches. Three are used in the conventional "Primary, Secondary and Monitor" switch arrangement shown below and the fourth sends a signal to the Logic PCB. The switches operate as follows:

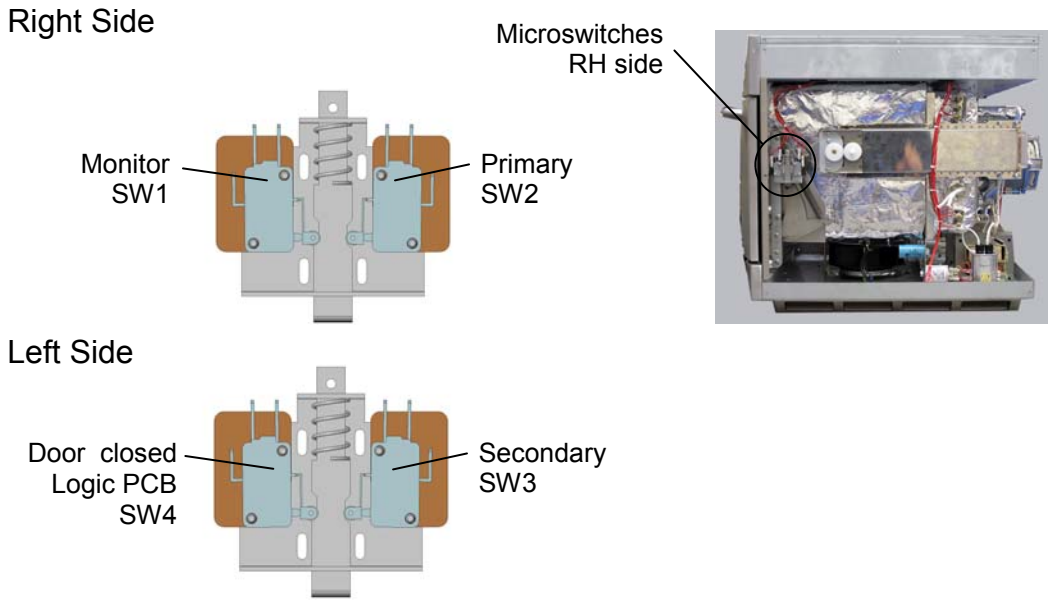
Door Interlock Arrangement: Switches shown in Door Closed position



1. **Monitor switch**
   The Monitor switch will produce a short circuit across the mains supply when the door is opened if the Primary interlock switch is faulty, thus blowing the microwave fuse and rendering the oven inoperative.

2. **Primary Interlock and Secondary Interlock**
   The Primary switch will cut off the microwave emissions from the oven when the door is opened by breaking the electrical supply circuit to the transformers. The Secondary interlock switch will cut off the microwave emission if the Primary switch has failed.

Note:
If operation of the Monitor switch has caused the Microwave Fuse to blow, the Primary and Monitor microswitches must be changed as they may have been damaged by the high short-circuit currents involved.



PROCEDURE FOR DOOR INTERLOCK ADJUSTMENT AND TEST 2

WARNING

Before adjusting the microswitch assemblies ensure that the oven has been isolated from the electrical supply and discharge the HT Capacitors.

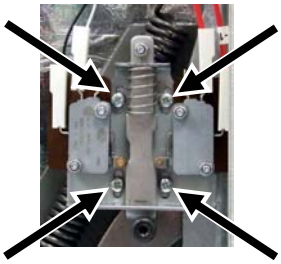
Please note the terminals on the microswitches remain live when the oven is switched off, so complete isolation is essential.

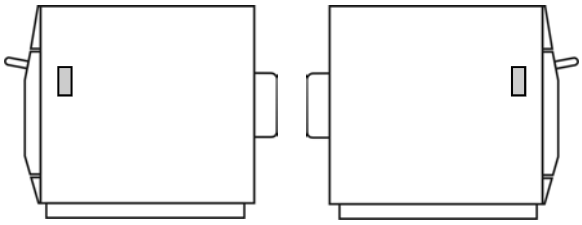
The purpose of this procedure is to set the interlock so that when the door is opened more than 4mm the Oven microwave circuit is switched OFF.

The door closed position [Microwave circuit ON] is actually set with a 2mm opening to allow for heat expansion when the oven is operating at full temperature.

WARNING
DO NOT set the microswitch assembly at the bottom of the adjustment slots as this would result in the microwave circuit operating for a much larger door opening distance and cause potential microwave leakage from the oven.

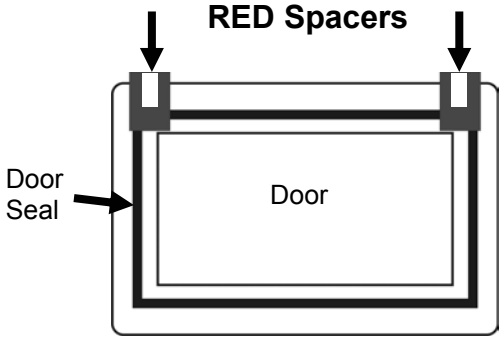
1 Release the 4 screws retaining each microswitch assembly



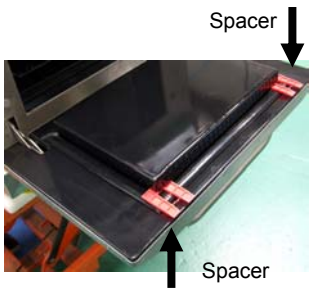


2 Position the door open with a 4mm gap:

Place the two **RED 4mm Spacers** over the door seal at the top of the door on each side at the corner and carefully close the door ensuring the spacer is on the door seal.

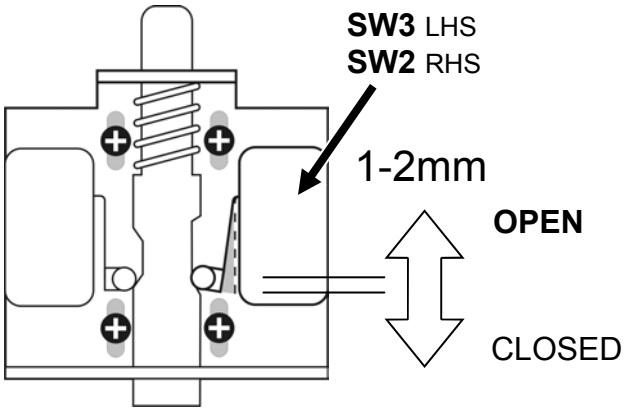


Smooth side of spacer to door seal



To set Microswitches **SW3** & **SW2** to **OPEN** [OFF] at a door opening with a 4mm gap:

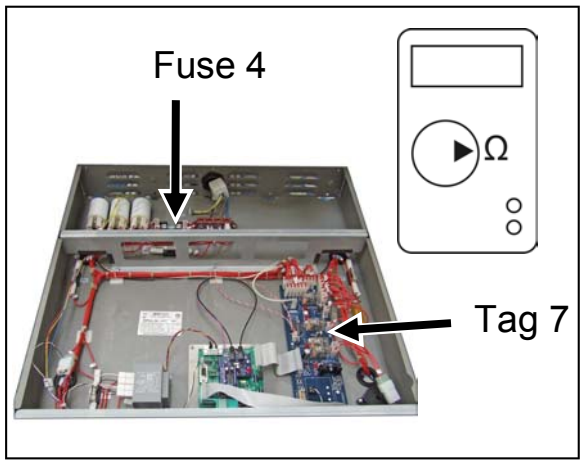
On the LHS of the oven, press down on the switch assembly to set **SW3** to just click CLOSED and then allow the assembly to move 1-2mm to just allow the switch to return to the **OPEN** position and tighten all 4 screws.



Repeat the procedure on the RHS of the

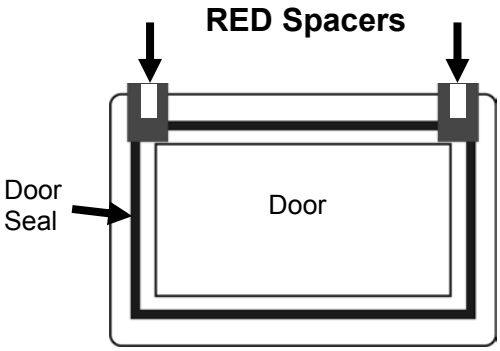
PROCEDURE FOR DOOR INTERLOCK ADJUSTMENT AND TEST 3

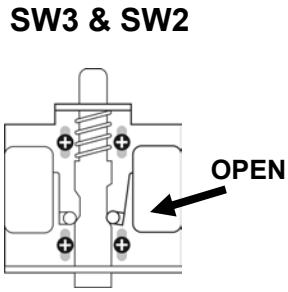
3 Remove the 4mm spacers and open and close the door 2 or 3 times to allow the parts to work together.

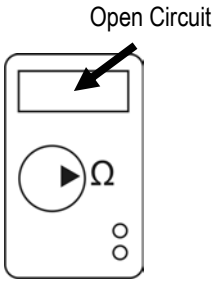


Set a Multimeter Resistance [Ω] and connect the meter to Fuse F4 and Tag 7 on the Relay PCB Board.

Replace the **RED 4mm spacers** on the door and over the corners of the seal as before.



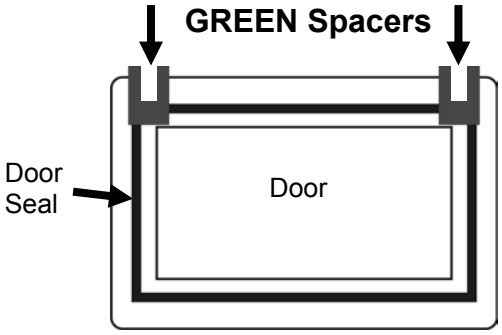


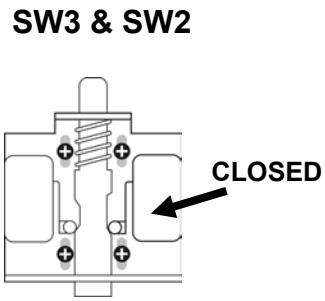


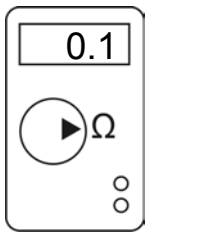
The meter should now read open circuit,
if not repeat steps 1 & 2 adjusting the switch assemblies slightly upwards, ensuring the Microswitches are in the **OPEN** [OFF] position.

4 To confirm the oven operates at a 2mm door open position.

Replace the 4mm spacers with the two **GREEN 2mm Spacers**.







Check that microswitches **SW2** and **SW3** are in the **CLOSED** [ON] position and the Multimeter reads a **minimal resistance.**

If the meter reads Open Circuit, remove the 2mm spacers and repeat steps 1-4 moving the switch assemblies very slightly further down.

This procedure may need to be repeated several times to achieve a satisfactory arrangement.

PRINCIPAL COMPONENTS: Hot Air Motor & Controller 1

Convection and Fan Speed Control

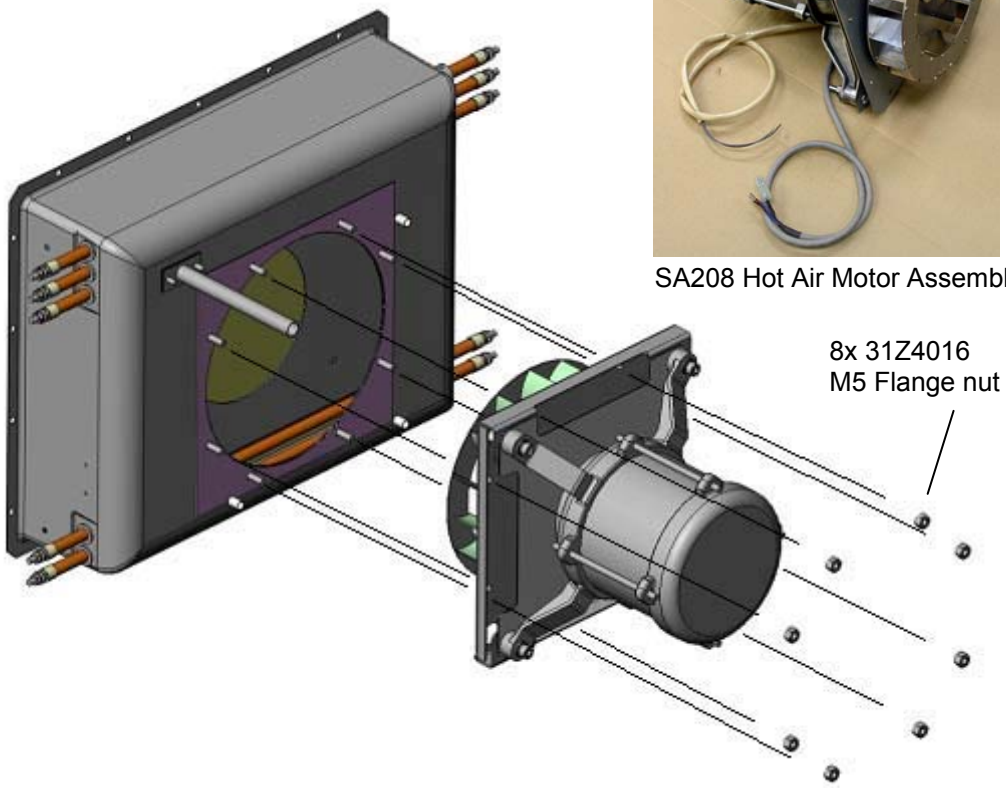
The convection heat is provided by 5 elements located in the hot box at the rear of the oven cavity. The hot air from the hot box passes over catalytic converters and is circulated into the bottom and top of the cavity through the impinger plates. It returns through the removable grease filter at the back of the cavity and into the fan.

Convection motor

The convection motor Is a 3-phase AC motor having a maximum speed of 7200 rpm controlled by a motor speed controller.
The windings are thermally protected and in the event of a thermal fault a trip inside the motor will operate and shut down the motor speed controller.

Step	Motor/ controller fault finding
1	Electrical supply into motor controller
2	Three phase connections to motor
3	Speed Controller connections to logic board
4	Motor thermal cut-out (short circuit)
5	Motor rotates freely/ not seized
6	Motor winding resistances: Blue-Black 3 Ohms—4 Ohms Black-Brown 3 Ohms—4 Ohms Brown-Blue 3 Ohms—4 Ohms Black or Brown or Blue to Earth (Open circuit)

SA208 Hot Air Motor Assembly

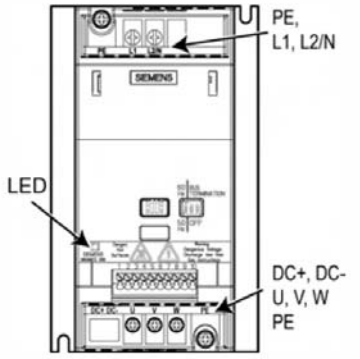


PRINCIPAL COMPONENTS: Hot Air Motor & Controller 2

Motor Controller

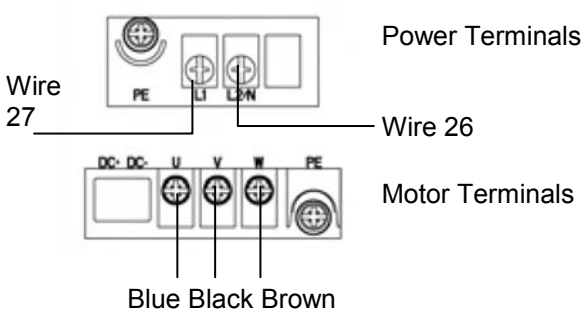
Provides an AC, 3-phase switched mode drive to the convection motor and is controlled by a 0 - 10 Volt signal from the logic board. This allows the motor to be adjusted from approximately 1500 rpm to 7000 rpm in steps of 5%.

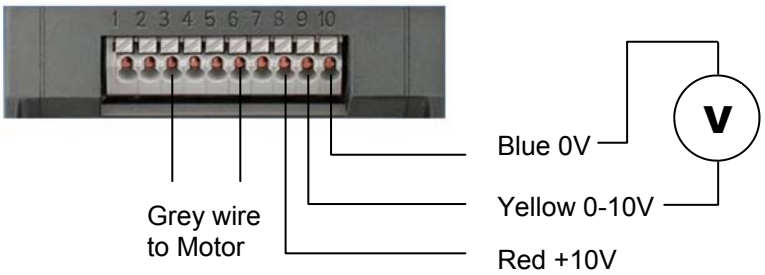
Door Open = 1500 RPM
Door Closed (not cooking) = 3500 RPM
Door Closed (cooking) = as specified by program or setting



Motor Speed and Logic board voltage table

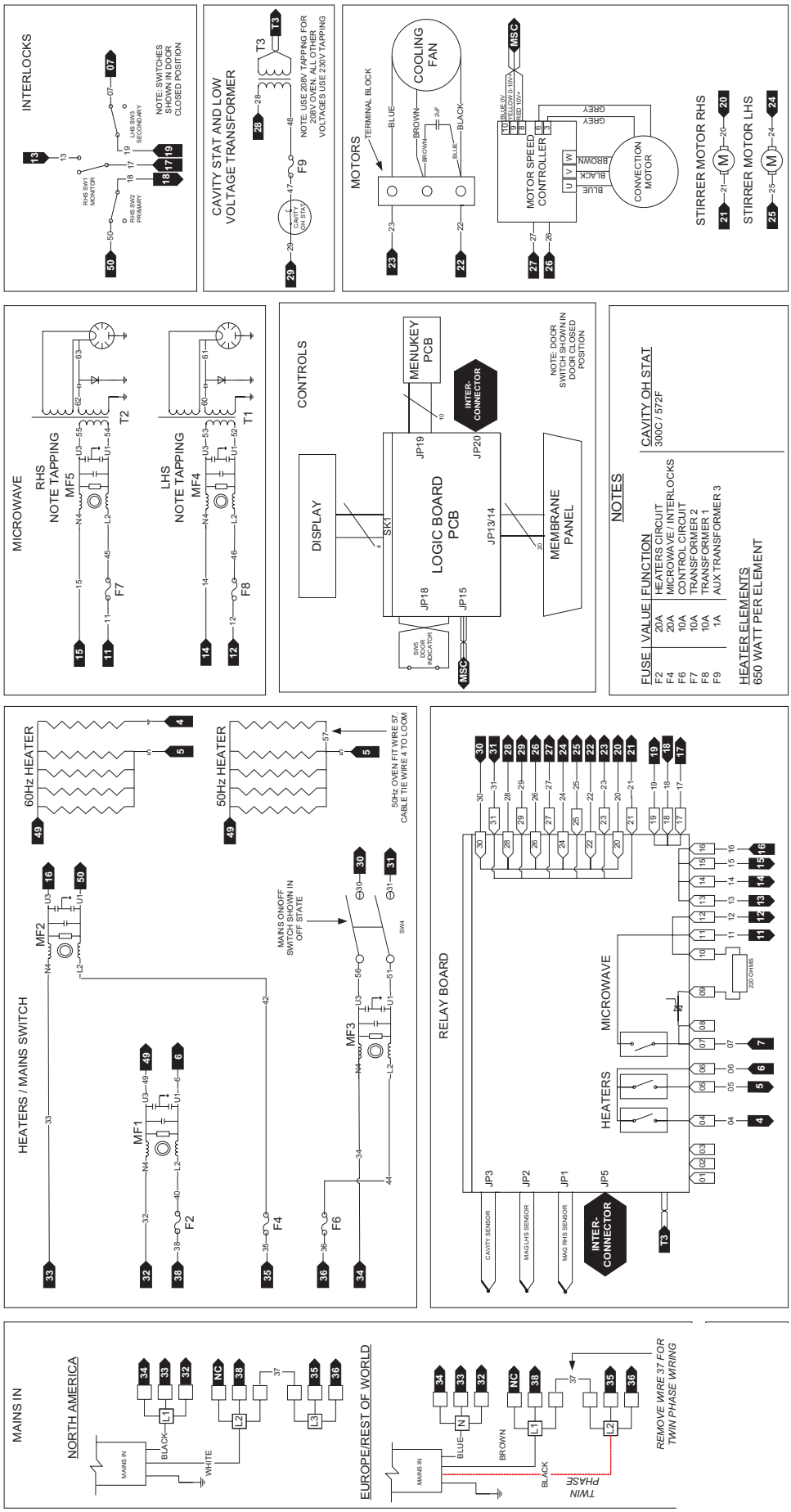
Fan speed %	Voltage dc	RPM	Condition
100%	10V	7000	Full Speed
50%	5V	3500	Door Closed
20%	2V	1500	Door Open



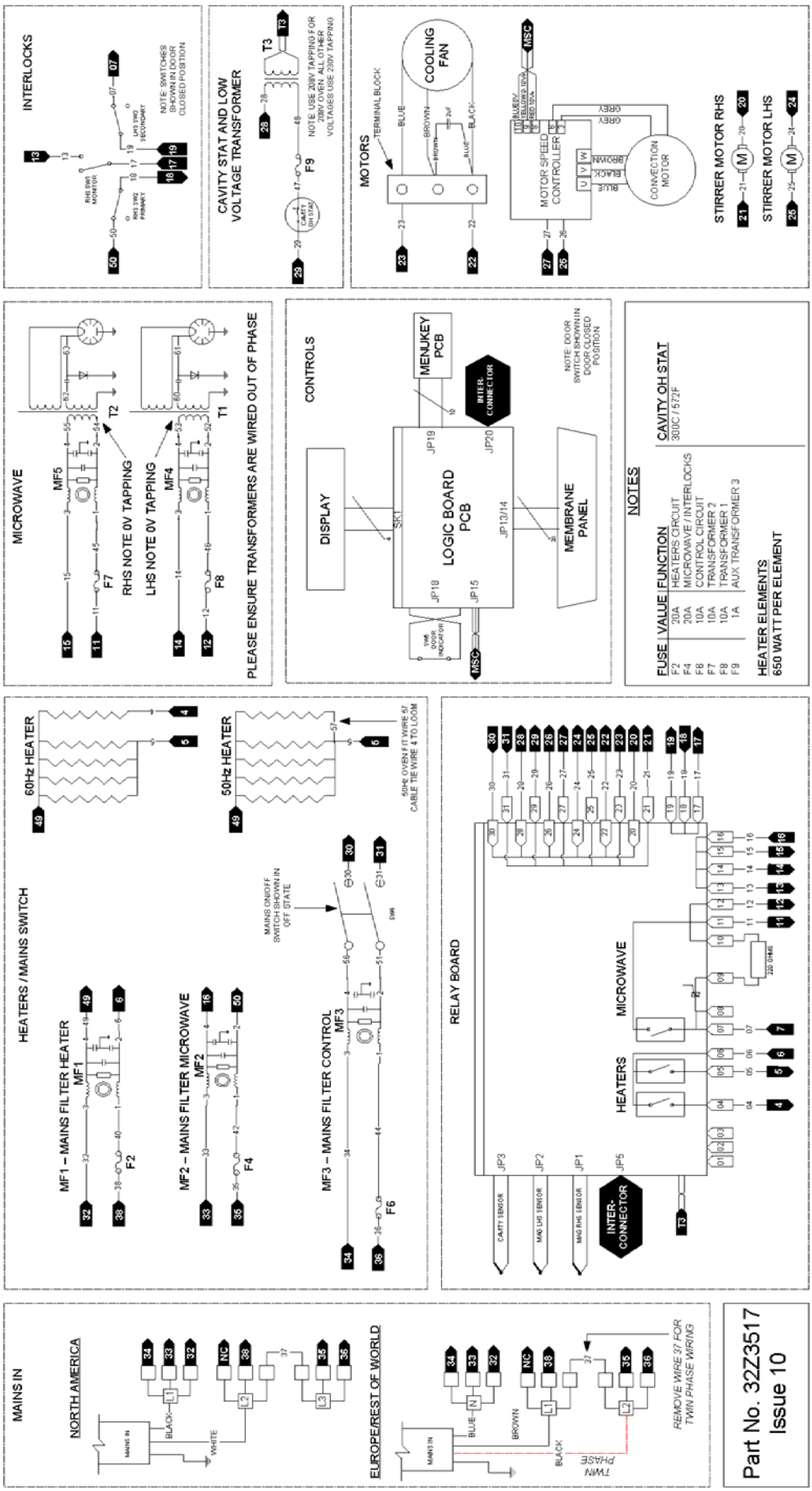


Displays and messages: LED status display

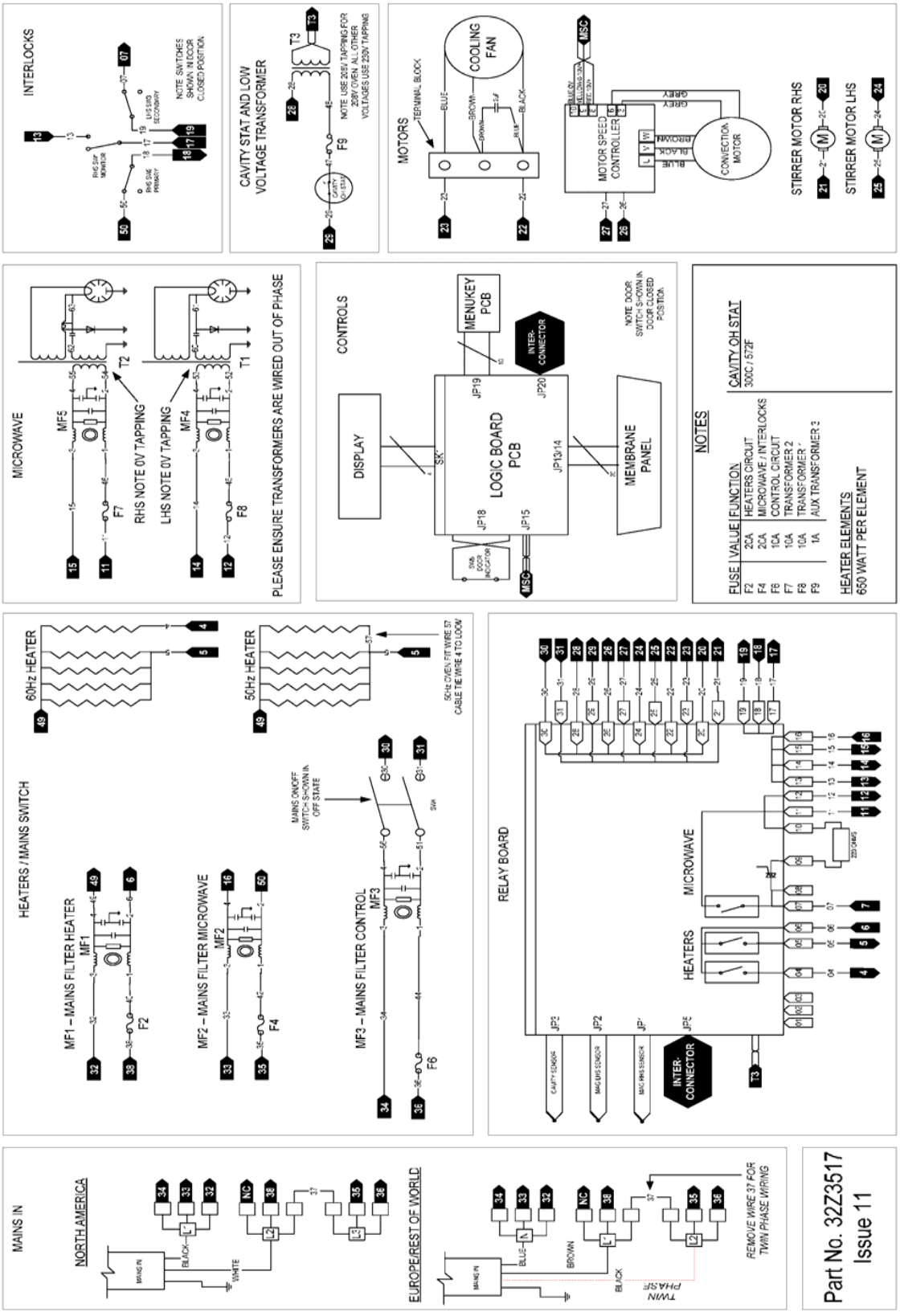
LED	Meaning	Position
LED Off	Inverter Off / No supply	LED
Long On & Off (1sec)	Power On / Ready	
LED On steadily	Inverter Running	
Long On (0.5 sec)/ short Off	General Warning	
Very Short On & Off (0.1sec)	Fault Condition	



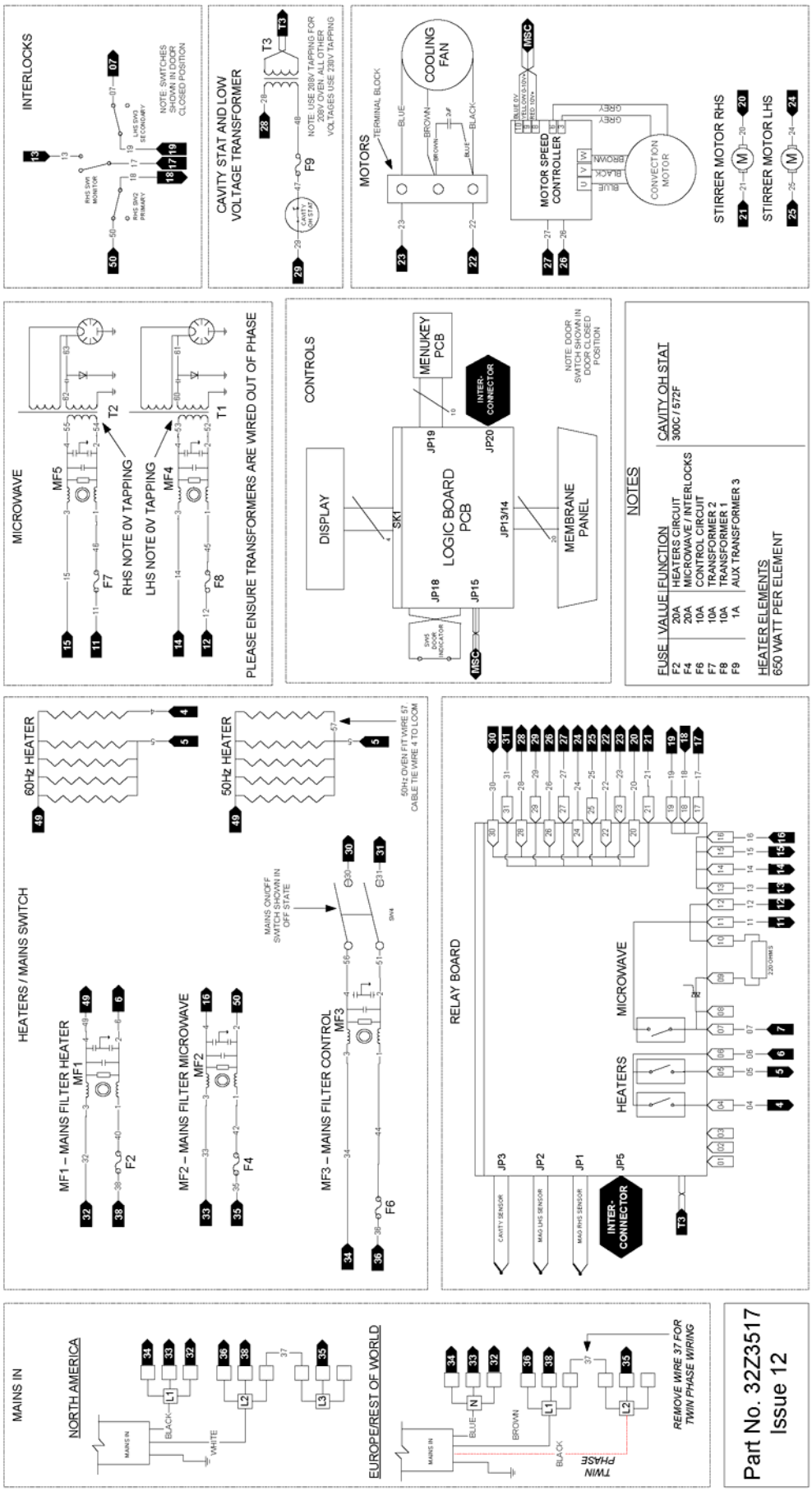
CIRCUIT DIAGRAM: Issue 9



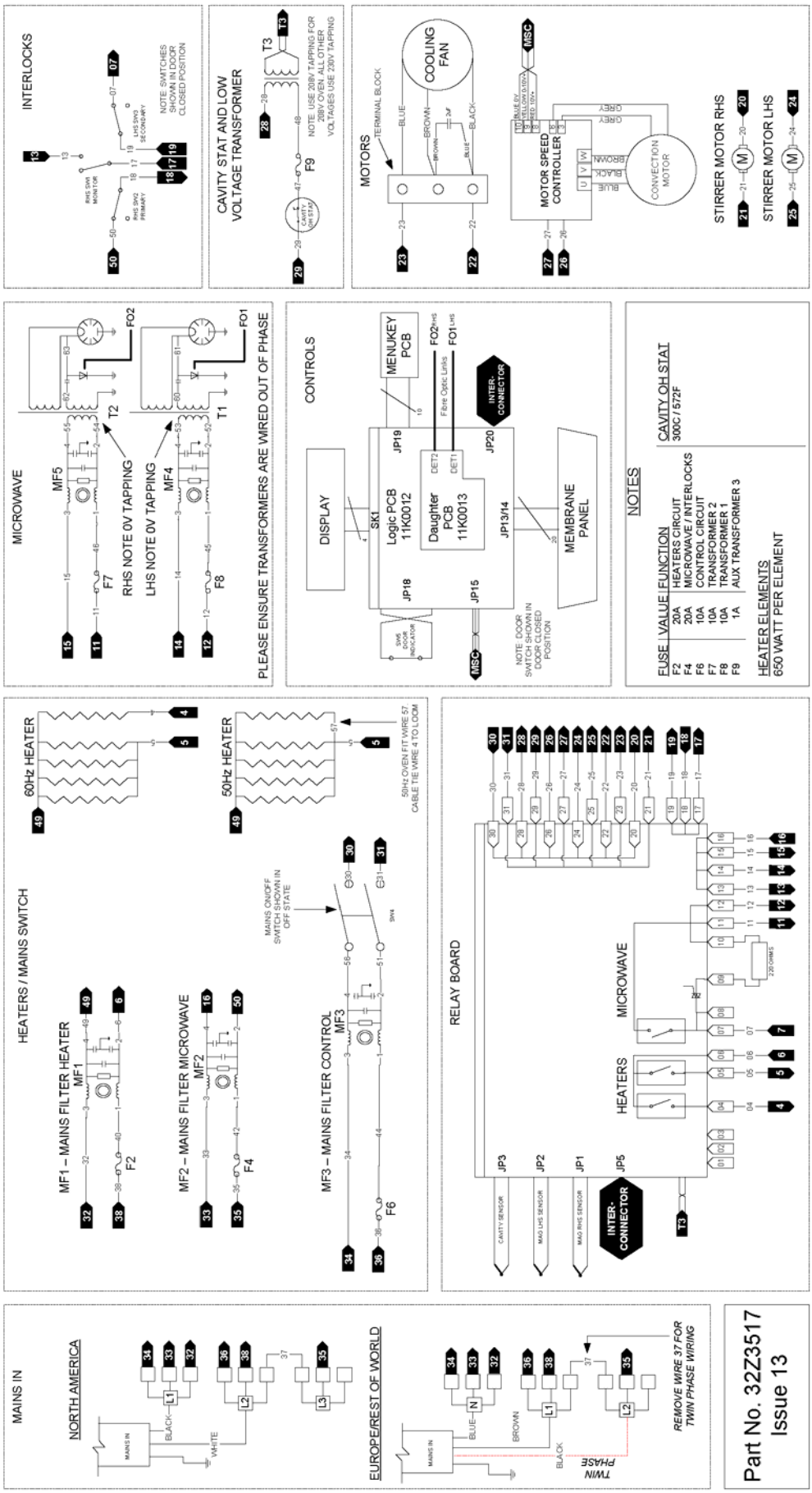
CIRCUIT DIAGRAM: Issue 10



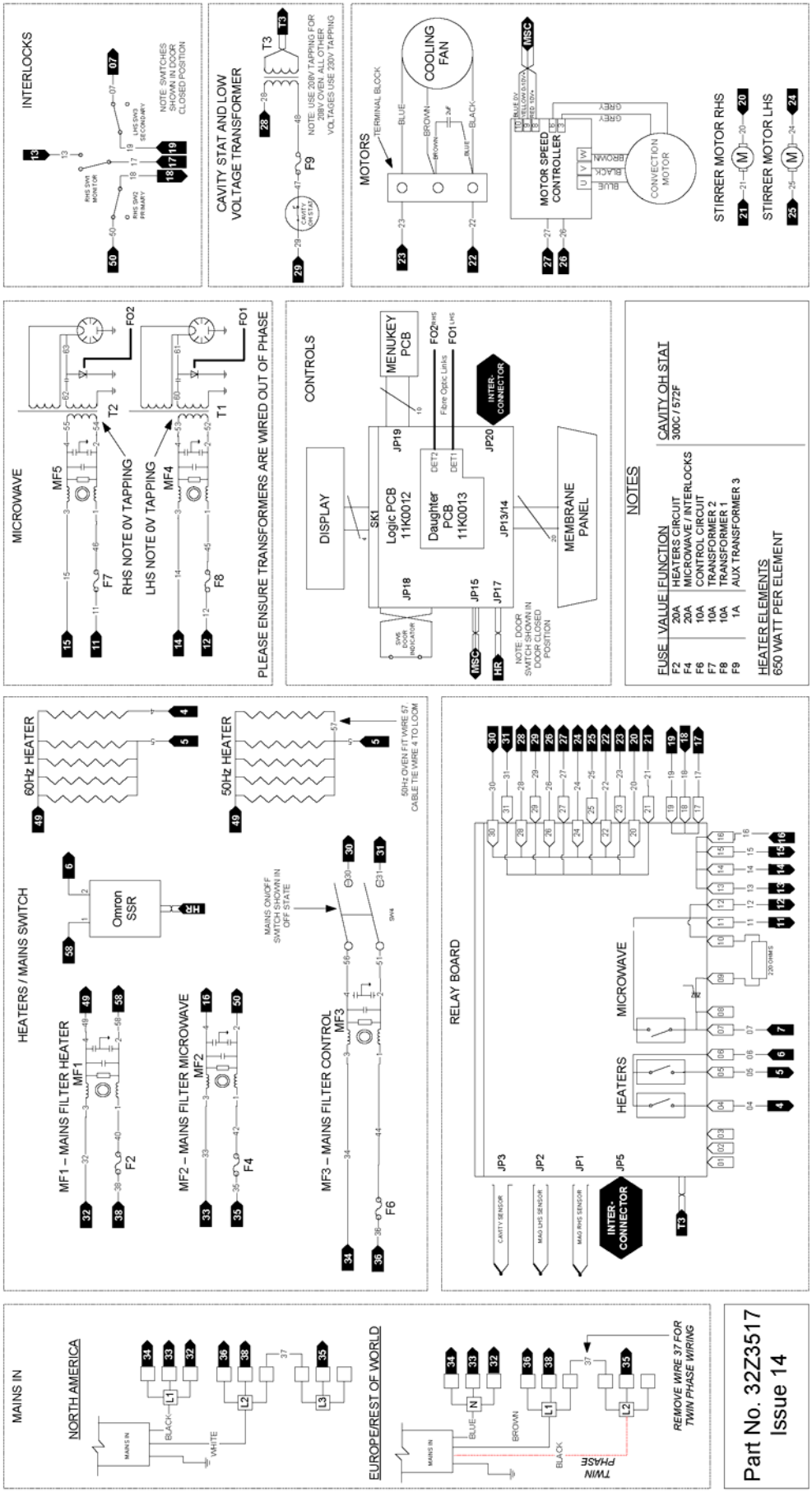
CIRCUIT DIAGRAM: Issue 11



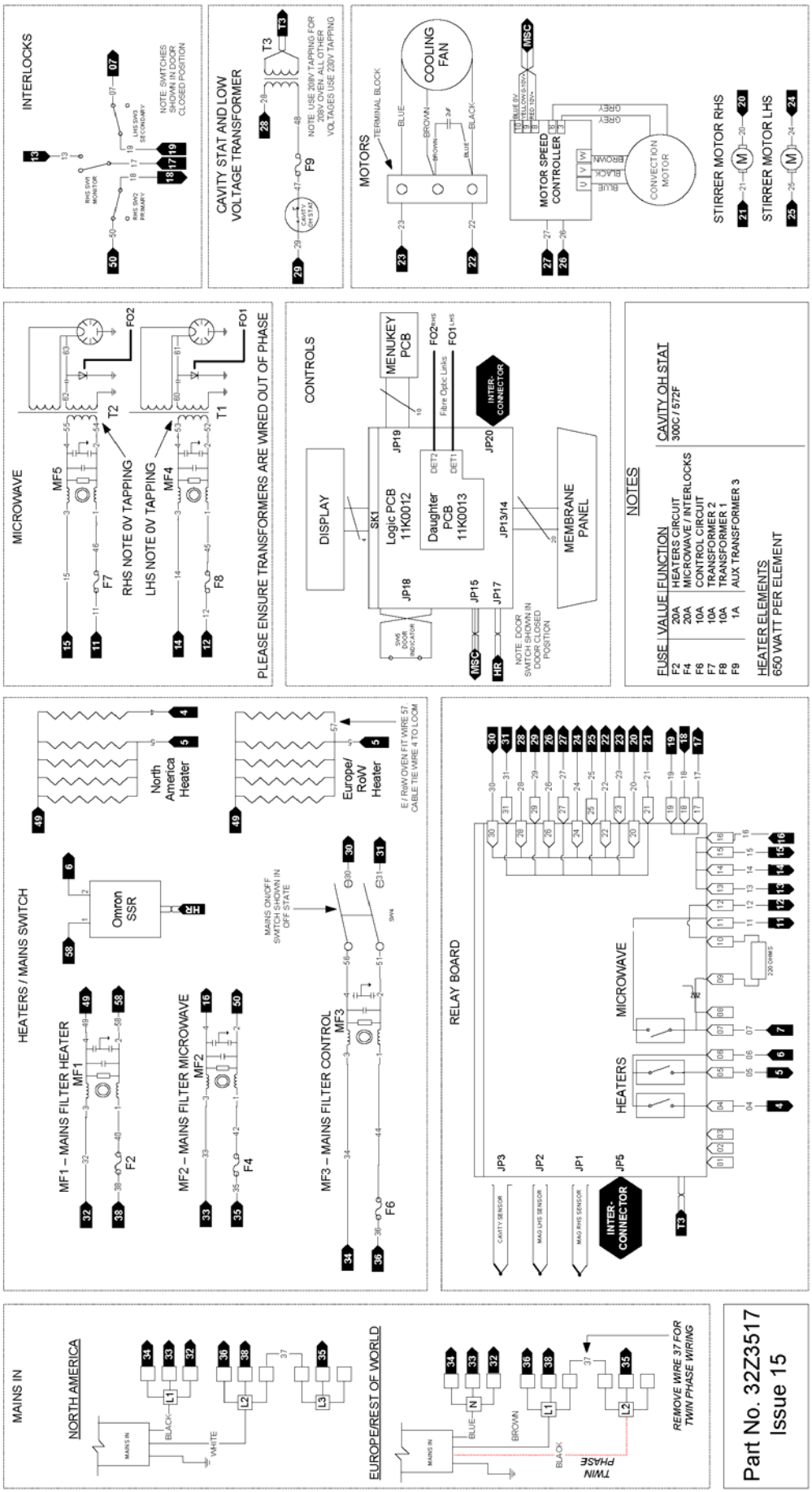
CIRCUIT DIAGRAM: Issue 12



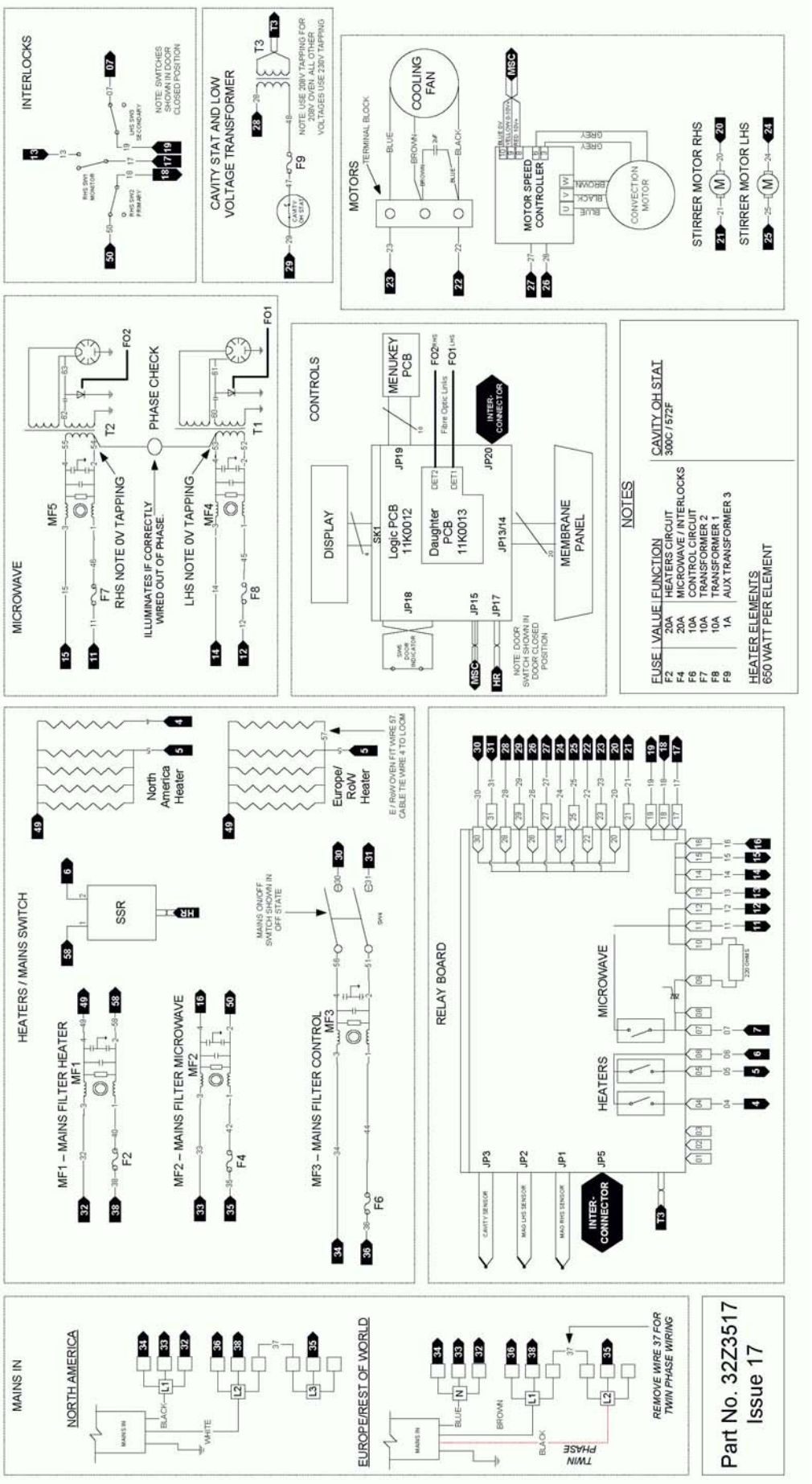
CIRCUIT DIAGRAM: Issue 13



CIRCUIT DIAGRAM: Issue 14



CIRCUIT DIAGRAM: Issue 15



CIRCUIT DIAGRAM: Issue 17

Trouble-Shooting Guide

Is the problem Food Quality or Fundamental Operational Issue?

Food Quality

Standard Food Quality Checks

- Check that the PREHEAT temperature is set correctly.
  See User Manual.
- Check that the food being cooked has been stored at the correct temperature.
- Check that the correct program is being used.

Still Have a problem:
Select a Category.

- **2.0 Cold Food**
- **2.0 Core Temperatures Low**

Fundamental

Standard Electrical Checks

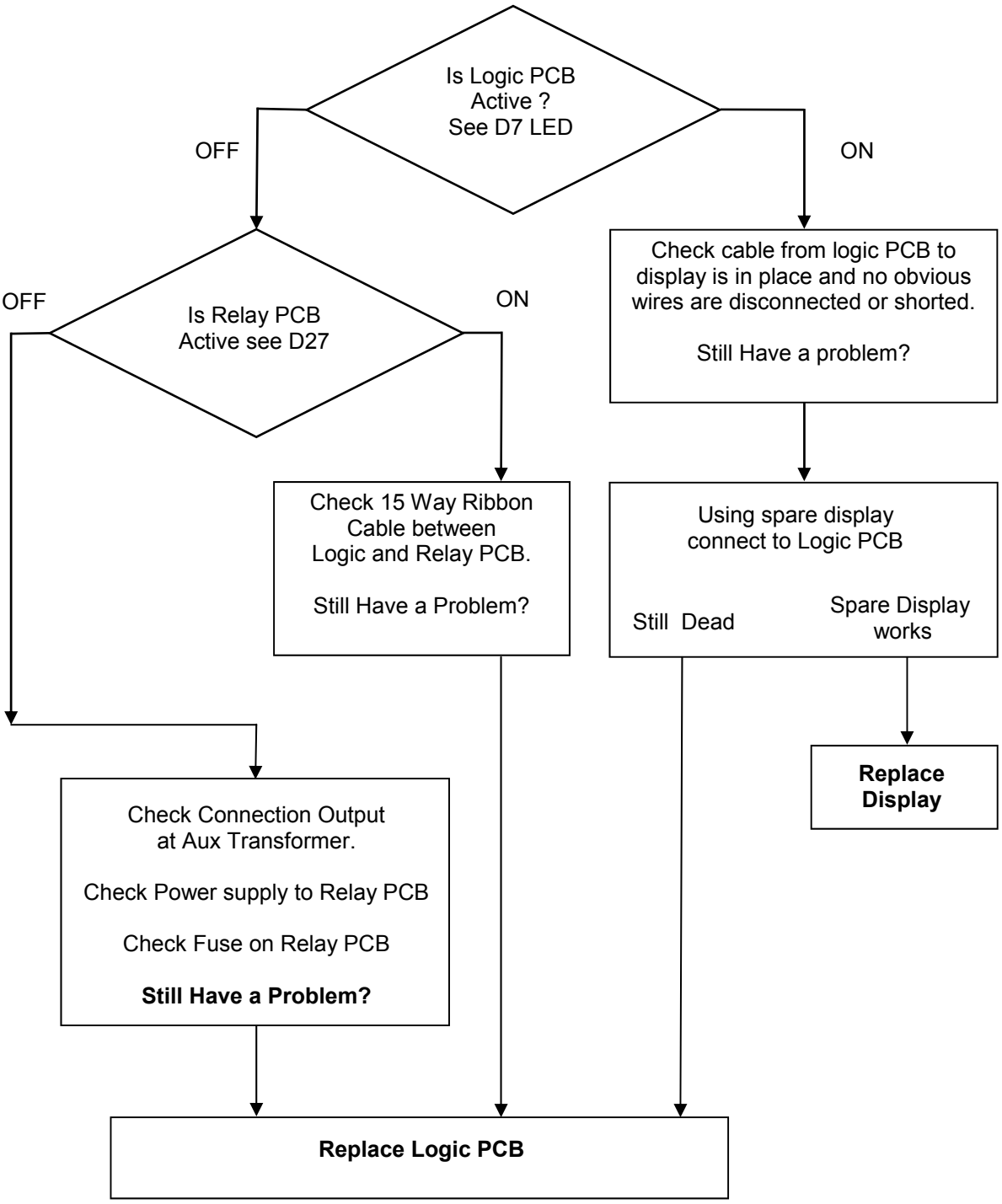
- Check that oven is connected to an Electricl Power supply and that any trip that supplies the unit is not switched off.
- Check that the oven is switched on.
- Check the Electricl Power supply voltage at the input terminal block.
- Check that all fuses are intact.
- Check that the overheat stat has not tripped this can be checked by measuring the voltage across the Auxiliary transformer.

Still Have a problem:
Select a Category.

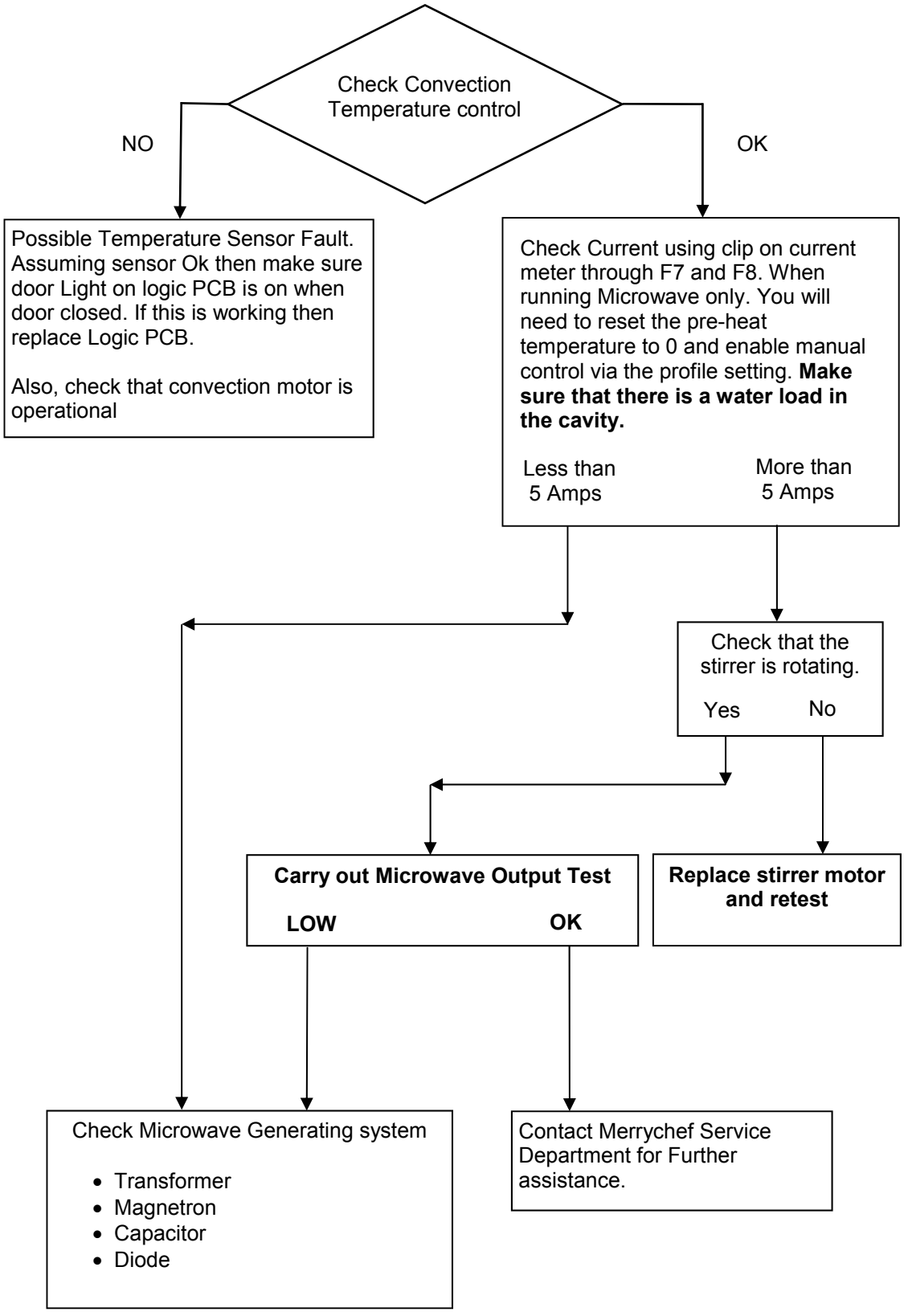
- **1.0 No Display**
- **3.0 Cavity Sensor Error**
- **4.0 Magnetron / Over heat errors**

Note : The following Diagnosis procedures may not expose all possible errors but have been included for general guidance.

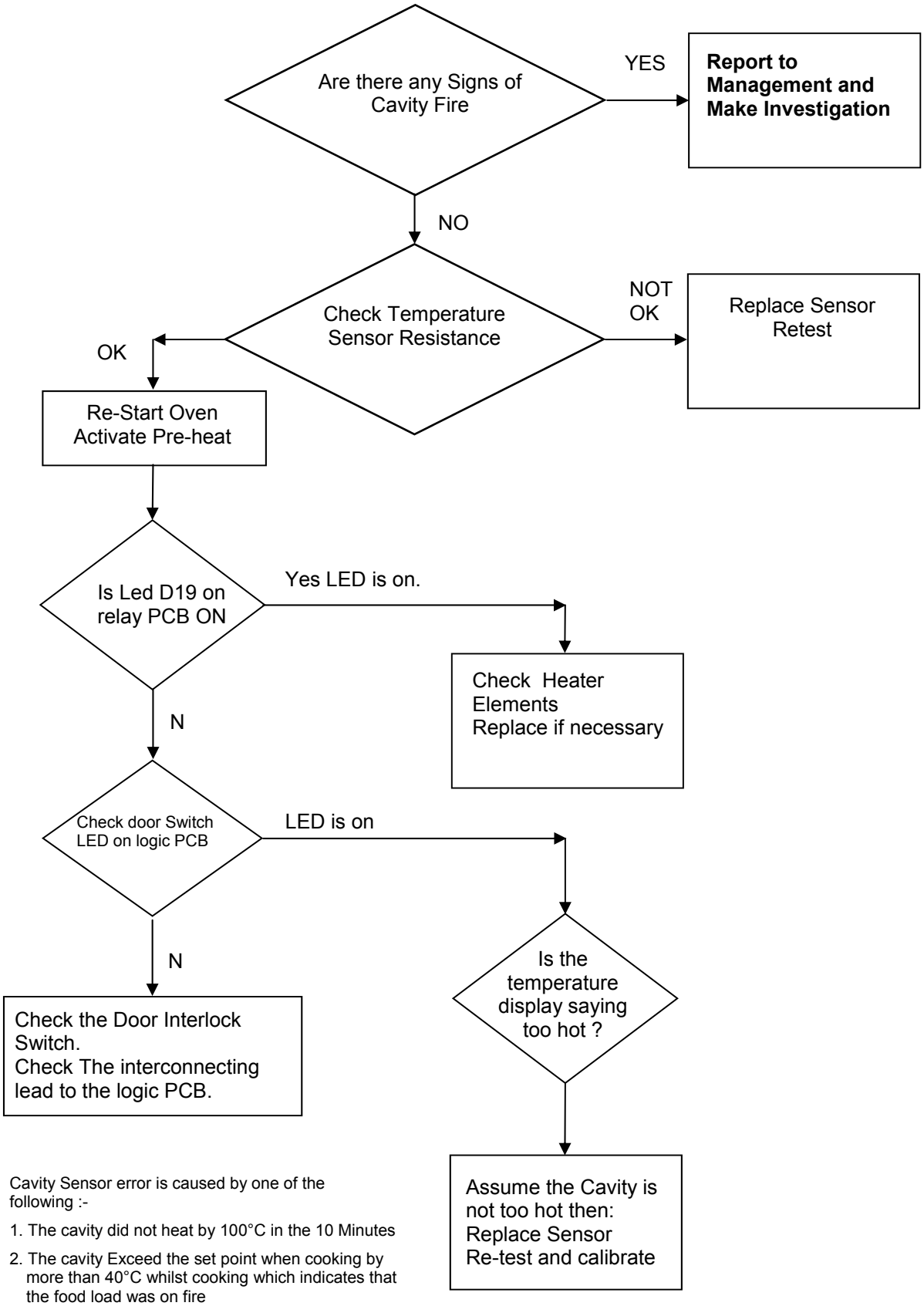
1.0 No Display


Is Logic PCB
Active ?
See D7 LED
OFF
ON
Is Relay PCB
Active see D27
OFF
ON
Check cable from logic PCB to display is in place and no obvious wires are disconnected or shorted.
Still Have a problem?
Check 15 Way Ribbon Cable between Logic and Relay PCB.
Still Have a Problem?
Using spare display connect to Logic PCB
Still Dead
Spare Display works
Replace Display
Check Connection Output at Aux Transformer.
Check Power supply to Relay PCB
Check Fuse on Relay PCB
Still Have a Problem?
Replace Logic PCB

2.0 Cold Food


Check Convection Temperature control
NO
OK
Possible Temperature Sensor Fault. Assuming sensor Ok then make sure door Light on logic PCB is on when door closed. If this is working then replace Logic PCB.
Also, check that convection motor is operational
Check Current using clip on current meter through F7 and F8. When running Microwave only. You will need to reset the pre-heat temperature to 0 and enable manual control via the profile setting. Make sure that there is a water load in the cavity.
Less than 5 Amps
More than 5 Amps
Check that the stirrer is rotating.
Yes
No
Carry out Microwave Output Test
LOW
OK
Replace stirrer motor and retest
Check Microwave Generating system
Transformer
Magnetron
Capacitor
Diode
Contact Merrychef Service Department for Further assistance.

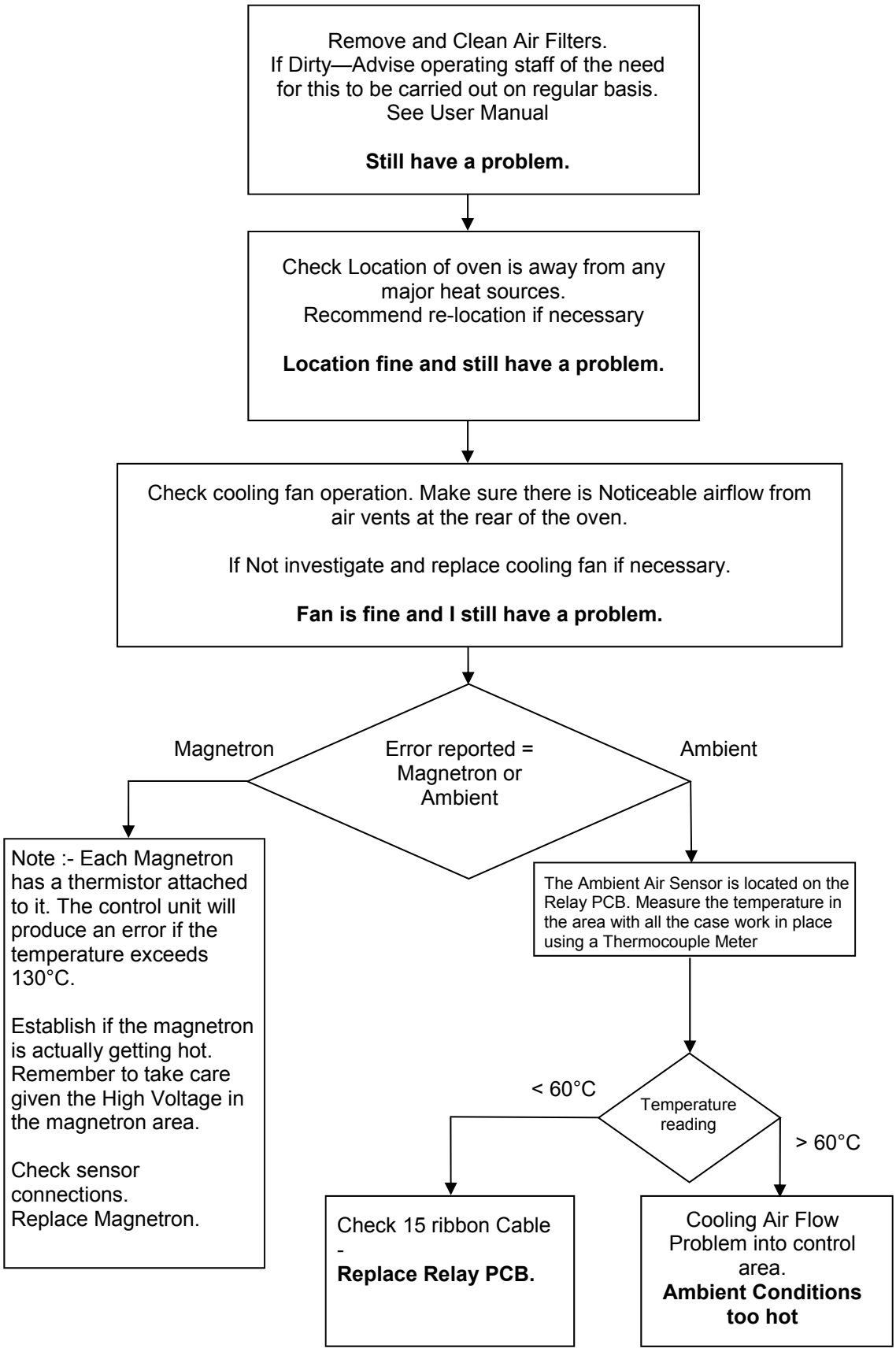
3.0 Cavity Sensor Error


Are there any Signs of Cavity Fire
YES
Report to Management and Make Investigation
NO
Check Temperature Sensor Resistance
NOT OK
Replace Sensor Retest
OK
Re-Start Oven Activate Pre-heat
Is Led D19 on relay PCB ON
Yes LED is on.
Check Heater Elements Replace if necessary
N
Check door Switch LED on logic PCB
LED is on
N
Check the Door Interlock Switch.
Check The interconnecting lead to the logic PCB.
Is the temperature display saying too hot ?
Assume the Cavity is not too hot then:
Replace Sensor
Re-test and calibrate

Cavity Sensor error is caused by one of the following :-

1. The cavity did not heat by 100°C in the 10 Minutes
2. The cavity Exceed the set point when cooking by more than 40°C whilst cooking which indicates that the food load was on fire

4.0 Magnetron / Overheat issues


Remove and Clean Air Filters.
If Dirty—Advise operating staff of the need for this to be carried out on regular basis.
See User Manual
Still have a problem.
Check Location of oven is away from any major heat sources.
Recommend re-location if necessary
Location fine and still have a problem.
Check cooling fan operation. Make sure there is Noticeable airflow from air vents at the rear of the oven.
If Not investigate and replace cooling fan if necessary.
Fan is fine and I still have a problem.
Error reported = Magnetron or Ambient
Magnetron
Ambient
Note :- Each Magnetron has a thermistor attached to it. The control unit will produce an error if the temperature exceeds 130°C.
Establish if the magnetron is actually getting hot. Remember to take care given the High Voltage in the magnetron area.
Check sensor connections.
Replace Magnetron.
The Ambient Air Sensor is located on the Relay PCB. Measure the temperature in the area with all the case work in place using a Thermocouple Meter
Temperature reading
< 60°C
> 60°C
Check 15 ribbon Cable -
Replace Relay PCB.
Cooling Air Flow Problem into control area.
Ambient Conditions too hot

APPENDIX 1: TEMPERATURE SENSOR RESISTANCE DATA

Temperature Sensor Resistance

Temp °F	Temp °C	Min. Rate kΩ	Standard Rate kΩ	Max. Rate kΩ
212	100	11.490	13.060	14.810
302	150	2.803	3.161	3.434
392	200	0.950	1.000	1.050
482	250	0.3572	0.3865	0.4171

R(200)°C = 1 kΩ ± 5%

Note:
These resistances will only be apparent in a stable cavity temperature as the sensor has a slow response time.

APPENDIX 2: MenuKey, changing oven menus

The MenuKey System automatically changes all the cooking programs on the oven from a pre-programmed electronic key.

To change the menus on the oven:

1 Ensure the power switch is **OFF**.

2 Lift the **MenuKey** cover in the top front panel of the oven and put the key in the slot.

3 With the key still in place switch the power switch **ON**.
The oven will now go through the program download sequence by displaying the following:

The MenuKey Code. e.g. 555

The MenuKey CS e.g. 0A06
MenuKey CS (checksum) confirms the menus on this key are valid for the MenuKey Code.

4 Confirm that the MenuKey Code and MenuKey CS are correct and press **Download** Function key to load the programs into the Oven memory.

Note: Downloading from a MenuKey will clear all the existing programs

Check that the key is correct then press the **Continue** function key to proceed with the Download

On completion of the download press the **Exit** function key to return the oven to standby mode. The display briefly will show the following:

Oven Model No. Software & MenuKey serial No.

The standby screen will then display

Remove the MenuKey and keep in a safe place.

Do not remove the key during download sequence as this could corrupt the data on the key

MENUKEY2 DETECTED
MK CODE 555
MK CS 0A06
Download Upload

Download

MENUKEY2 DETECTED
MK CODE 555
MK CS 0A06
Download Upload

WARNING
ALL OVEN PROGRAMS
WILL BE OVERWRITTEN
Exit Continue

Continue

MENUKEY2
DOWNLOADING

MENUKEY2
VERYIFYING

Exit

MENUKEY2 DOWNLOAD
COMPLETE
CHECKSUM:0A06
Exit

Model No. 402S
Software
MK serial No.

OVEN COLD
PRESS PREHEAT

APPENDIX 2: MenuKey, changing oven menus

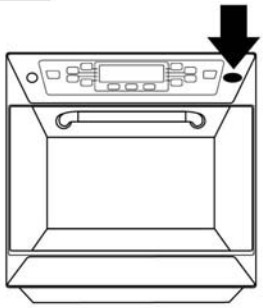
The MenuKey System automatically changes all the cooking programs on the oven from a pre-programmed electronic key.

To change the menus on the oven:

WARNING
Downloading from a MenuKey will clear all the existing programs

Do not remove the key during download sequence as this could corrupt the data on the key

Check that the key has the correct number/code for the programs you want to load into the oven memory



1 Ensure the power switch is **OFF**.

2 Lift the **MenuKey** cover in the top front panel of the oven and put the key in the slot.

3 With the key still in place switch the power switch **ON**. The oven will now go through the program download sequence by displaying the following:

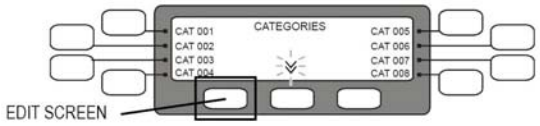
MenuKey Detected Please Wait	Copying Programs from MenuKey to Oven	Verifying Programs Copied Correctly	MenuKey Copied Successfully

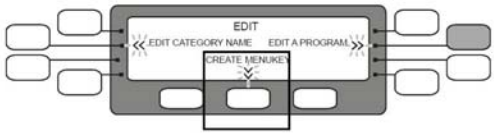
The display briefly will show the following : Oven Model No., Software & MenuKey serial No.
The Oven will then commence heating up to the PREHEAT temperature ready to cook.

4 Remove the MenuKey and keep in a safe place.

Saving Programs to a MenuKey

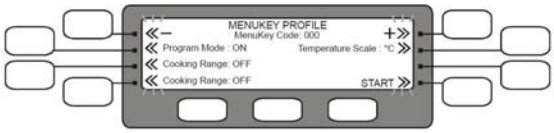
In the **CATEGORIES** screen select **EDIT SCREEN** (Pad name hidden) then select **CREATE MENUKEY**





1 Enter a number for the MenuKey Code to identify the new MenuKey, use the +/- Function Pads.

For an explanation of the following features see Setting the Oven Profile Page 11



2 Set the Program Mode to **ON** or **OFF**,
3 Set Manual Mode to **ON** or **OFF**:
4 Enter the Lower Band temperature setting **15-75°C**
5 Set the oven Temperature Scale **°C**

Insert a MenuKey and press START to copy the programs.
The display shows the following:

WARNING
Any programs already on the key will be deleted

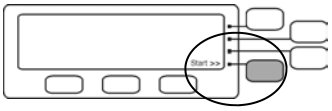
Copying Programs from Oven to MenuKey	Verifying Programs Copied Correctly	MenuKey Copied Successfully

The Display returns to the CATEGORIES screen and the Oven will heat up to the PREHEAT temperature ready to cook.

temperature ready to cook.

APPENDIX 3: Cool Down Procedure

To cool down and clean a hot oven

Action	EC402s V2.0	EC 402s V3.0
To commence **Cool Down** procedure Press		
Place Ice in cavity	COOL DOWN MODE PLACE ICE IN CAVITY	COOL DOWN MODE PLACE LOAD IN CAVITYAND PRESS START
Press	Continue	 Start
The oven cools down for approximately 30 minutes	COOL DOWN MODE OVEN HOT PLEASE WAIT (Also in Spanish)	COOL DOWN MODE OVEN HOT PLEASE WAIT
Cycle ends	COOL DOWN COMPLETE READY FOR CLEANING	Turn oven off and ensure Air Filters are clean
Switch oven off ready for cleaning		

APPENDIX 3: Cleaning procedure 1

For the oven to operate at peak efficiency, the cavity, door and air filters and grease filter must be kept clean.

A daily cleaning routine will ensure that you comply with the required hygiene standards and will help to maintain and prolong the efficiency of your oven.

Follow the SAFETY INSTRUCTIONS at the beginning of this manual.

WARNING: DO NOT use caustic cleaners on any part of the oven or oven cavity as it will cause permanent damage to the Catalytic Convertors

- **ALWAYS switch off at the electrical supply before cleaning**
- **Complete COOL DOWN procedure and allow the oven and accessories to cool before commencing cleaning**
- **As required wipe out spillages with disposable paper wipes**
- **NEVER use steel wool, knives or harsh abrasives on any part of the oven**

Hot surface Hazard

Faults arising from neglect or misuse including use without clean filters in place are not covered by the guarantee. Service visits as a result of such faults will be chargeable.

As with all electrical appliances, it is wise to have the electrical connections inspected periodically.

DO NOT use the oven without clean air filters and cavity grease filter in place

START UP: OVEN COATING PROCEDURE (clean, cold oven)

1. With the oven clean and cold, spray Merrychef Oven Protector onto the sponge

2. Spread Oven Protector lightly onto all internal surfaces of the oven

3. Spread Oven Protector lightly onto the internal surface of the oven door

4. Switch the oven ON when the oven has reached operating temperature it will take 30 minutes to cure the Oven Protector.

Note: oven protector turns light brown when cured

DO NOT use the oven without clean air filters and cavity grease filter in place

*When replacing impinger plates and the cavity grease filter use firm finger pressure to tighten fasteners
DO NOT USE TOOLS

APPENDIX 3: Cleaning procedure 2

- **ALWAYS switch off at the electrical supply and allow oven to cool before cleaning**
- **CAUTION: Allow the oven and accessories to cool before commencing cleaning**

WARNING: DO NOT use caustic cleaners on any part of the oven or oven cavity as it will cause permanent damage to the Catalytic Convertors

Equipment: Merrychef oven cleaner, Merrychef Oven Protector, heat proof gloves, protective rubber gloves, non–abrasive nylon scrub pad, cleaning towel and cloths, eye protection and dust mask (optional)

COLD OVEN: CLEANING INSTRUCTIONS (following cool down)

CAUTION: Wear protective rubber gloves when cleaning the oven

Oven Parts and filters & Oven Cavity

Wash all parts in warm soapy water. Wash off using a clean cloth and plenty of clean, warm water. Dry using a fresh, clean cloth.

Remove air filters both sides

Remove the rack and lift out bottom impinger plate

Remove top impinger plate

Undo fasteners

To remove grease filter push down and lift out

If the door seals are damaged, the oven must be repaired by an approved Servicer.

DO NOT spray directly into the fan opening at the rear of the oven

1.
Wear protective rubber gloves and protective glasses carefully spray Merrychef Oven Cleaner onto the internal surfaces of the oven except door seals.
DO NOT spray directly into the fan opening at the rear of the oven

2.
For difficult areas leave to soak for 10 minutes. Leave the oven door open during cleaning. Use a non–abrasive nylon scrub pad/sponge to clean all internal surfaces and the inside of the door.

3.
Wash off using a clean cloth and plenty of clean warm water to rinse top, sides and back of oven. Dry using a fresh clean cloth or paper towel. Wipe the outside of the oven with a damp cloth.

4.
Replace clean oven parts

Grease Filter*
Top plate*
Bottom plate*
Air filters x2

DO NOT USE TOOLS

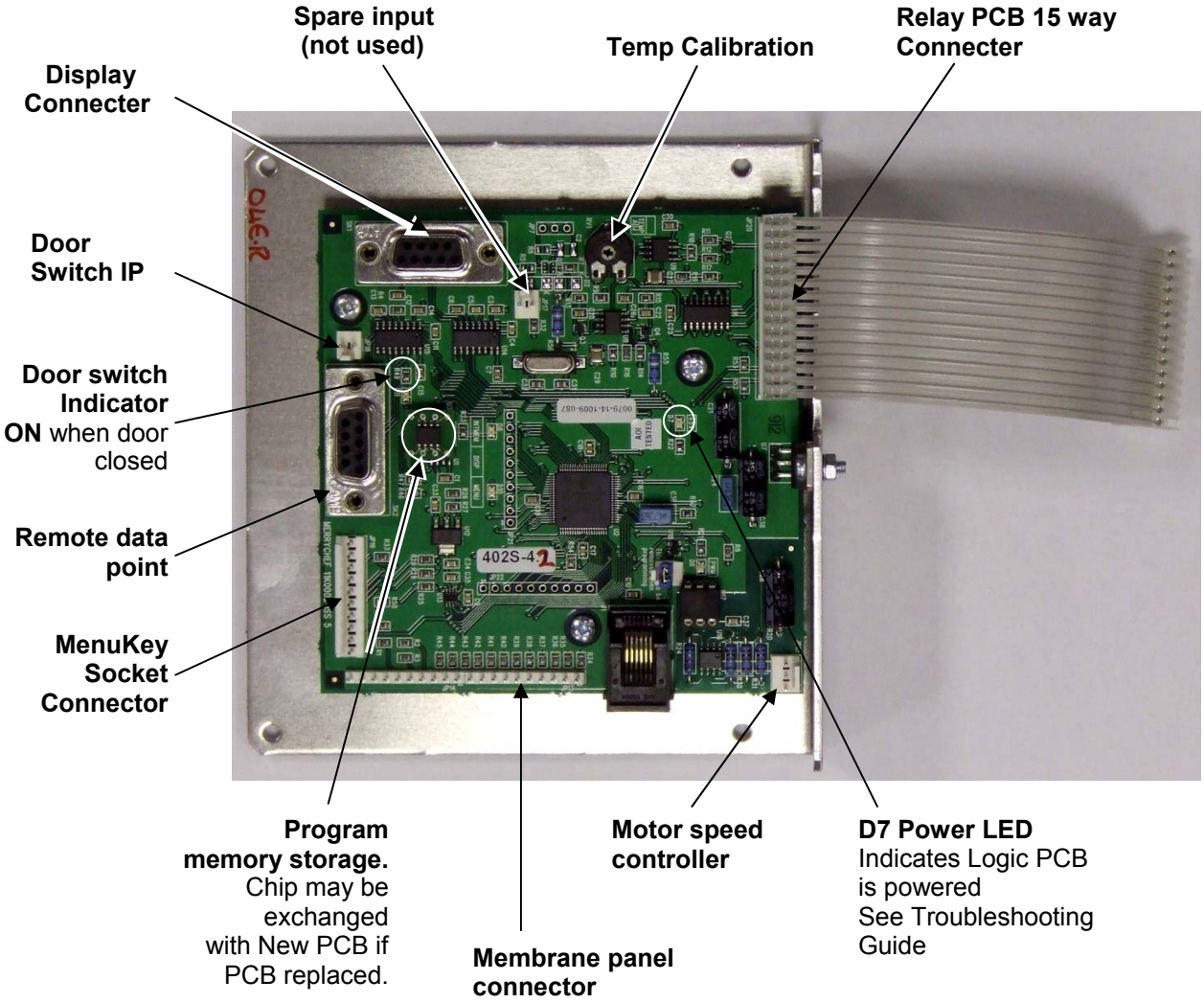
DO NOT use the oven without clean air filters and cavity grease filter in place

*When replacing impinger plates and the grease filter, use firm finger pressure to tighten fasteners DO NOT USE TOOLS

APPENDIX 4: Recommended spares lists UK/EC

Part No.	Description	Qty	Unit	First Aid Kit	Service Kit	1-5 Ovens	5-50 Ovens	50-100 Ovens	Piece Qty for 600 Ovens
11H0364	HT DIODE PCB ASSY	2	EA	2	2	2	6	12	72
11K0004	RELAY PCB	1	EA		1	1	3	6	36
11M0117	DC VOLTAGE CONNECTOR 10 WAY	1	EA	1	1	1	3	6	36
11Z0298	15 WAY 0.1 RIBBON CABLE ASSY	1	EA	1	1	1	3	6	36
30Z0217	FUSE 1in 10A HRC	5	EA	5	5	5	15	30	180
30Z0231	FUSE HOLDER 1IN (13A)	3	EA	3	3	3	9	18	108
30Z0957	FUSE 1x1/4in 1A HBC (MAINS)	1	EA	1	1	1	3	6	36
30Z1340	FILTER 16A (Threaded)	2	EA	2	2	2	6	12	72
30Z1155	BLOCK TRANSFORMER B0012024	1	EA		1	1	3	6	36
30Z1349	MAGNETRON Toshiba	2	EA	1	2	2	6	12	72
30Z1177	20 AMP LITTELFUSE FLM020	4	EA	4	4	4	12	24	144
30Z1178	30A FUSE HOLDER	4	EA	2	4	4	12	24	144
30Z1230	60HZ TRANS MULTI 208 220 240	2	EA	1	2	2	6	12	72
30Z1233	50HZ TRANS MULTI 208 220 240	2	EA	1	2	2	6	12	72
30Z1331	1.0uF 2500V (50HZ Model)	1	EA	1	2	2	6	12	72
30Z1242	1.1uF 2500V (50HZ Model)	1	EA	1	2	2	6	12	72
30Z1251	0.88uF 2500V (60Hz Model)	2	EA	2	4	2	6	12	72
30Z1294	MICROSWITCH WITH ROLLER	4	EA	2	2	2	6	12	72
30Z1295	MAGNETRON COOLING FAN	1	EA		1	1	3	6	36
30Z1298	CAPACITOR - MOTOR START - 2uF	1	EA		1	1	3	6	36
30Z1299	DISPLAY ASSY + HEADER	1	EA		1	1	3	6	36
SA234	THERMISTOR SENSOR ASSEMBLY	2	EA	2	2	2	6	12	72
30Z1315	THERMISTOR 150MM + LEAD 900MM	1	EA	1	1	1	3	6	36
30Z1318	2 POLE ROUND ROCKER SWITCH	1	EA	1	1	1	3	6	36
30Z1319	MOTOR SPEED CONTROLLER	1	EA		1	1	3	6	36
31Z0186	DOOR SEAL SEALANT - 1 TUBE	1	TUBE	1	1	2	6	12	72
31Z0527	STIRRER COVER - SEALANT 1 TUBE	1	TUBE	1	1	2	6	12	72
31Z1247	MICROSWITCH INTERLOCK SPRING	1	EA	1	1	1	3	6	36
32Z4028	COOL DOWN TRAY	1	EA			2	6	12	72
DV0037	BOTTOM TRIM	1	EA			1	1	2	12
SA273	CONTROL FASCIA ASSY V2.0/2.5	1	EA		1	1	3	6	36
DV0091	SIDE PANEL L/H	1	EA			1	1	2	12
DV0092	SIDE PANEL RH	1	EA			1	1	2	12
DV0305	DOOR SEAL (WIDE)	1	EA	1	1	2	6	12	72
DV0203	SEAL - CERAMIC COVER	2	EA	2	2	2	6	12	72
SA274	CONTROL FASCIA ASSY V3.0	1	EA		1	1	3	6	36
DV0275	RACK V3.0	1	EA			1	3	6	36
DV0492	STIRRER COVER - CERAMIC	2	EA	2	2	2	6	12	72
DV0606	HEATER ELEMENT 220V	5	EA	3	5	5	15	30	180
DV0607	HEATER ELEMENT 240V	5	EA	3	5	5	15	30	180
SA111	DOOR ASSEMBLY (V2.0, V3.0)	1	EA			1	1	2	12
SA208	HOT AIR MOTOR ASSY	1	EA		1	1	3	6	36
SA225	MAINS LEAD ASSY (EU) 4-CORE	1	EA		1	1	2	4	24
SA226	MAINS LEAD ASSY (UK) 3-CORE	1	EA		1	1	2	4	24
SA231	LOGIC BOARD MAIN ASSY V2.0/2.5	1	EA		1	1	3	6	36
SA288	STIRRER MOTOR ASSY	1	EA		1	1	3	6	36
SA260	LOGIC BOARD MAIN ASSY V3.0	1	EA		1	1	3	6	36
SA276	AIR FILTER	2	EA	2	2	2	6	12	72
SA314	CATALYST ASSY UPPER	1	EA			1	1	1	6
SA315	CATALYST ASSY LOWER	1	EA			1	1	1	6
SA329	REAR PANEL	1	EA			1	1	2	12
SA339	GREASE FILTER HOUSING	1	EA			1	1	2	12
SA340	GREASE FILTER CARTRIDGE	1	EA		1	1	2	3	18

APPENDIX 5: LOGIC PCB Connection Points and key features.


Spare input (not used)
Temp Calibration
Relay PCB 15 way Connecter
Display Connecter
Door Switch IP
Door switch Indicator ON when door closed
Remote data point
MenuKey Socket Connector
Program memory storage. Chip may be exchanged with New PCB if PCB replaced.
Membrane panel connector
Motor speed controller
D7 Power LED Indicates Logic PCB is powered See Troubleshooting Guide

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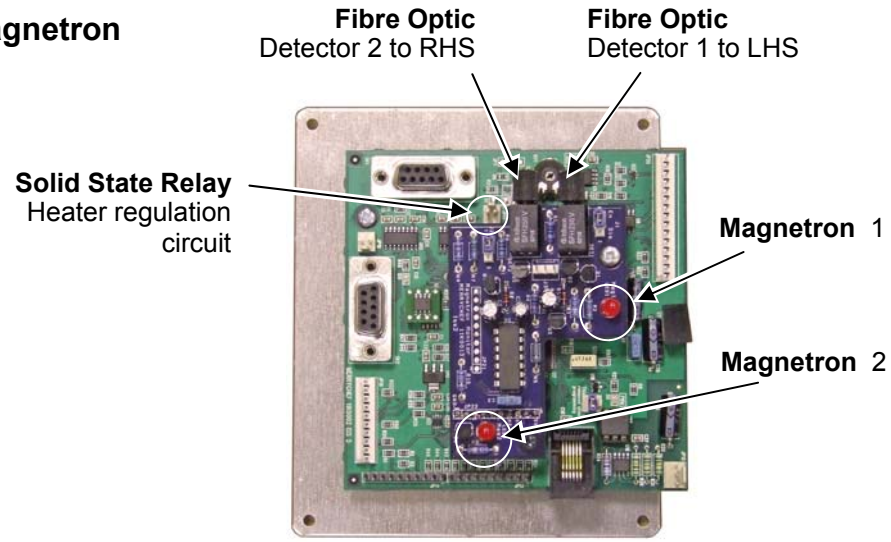
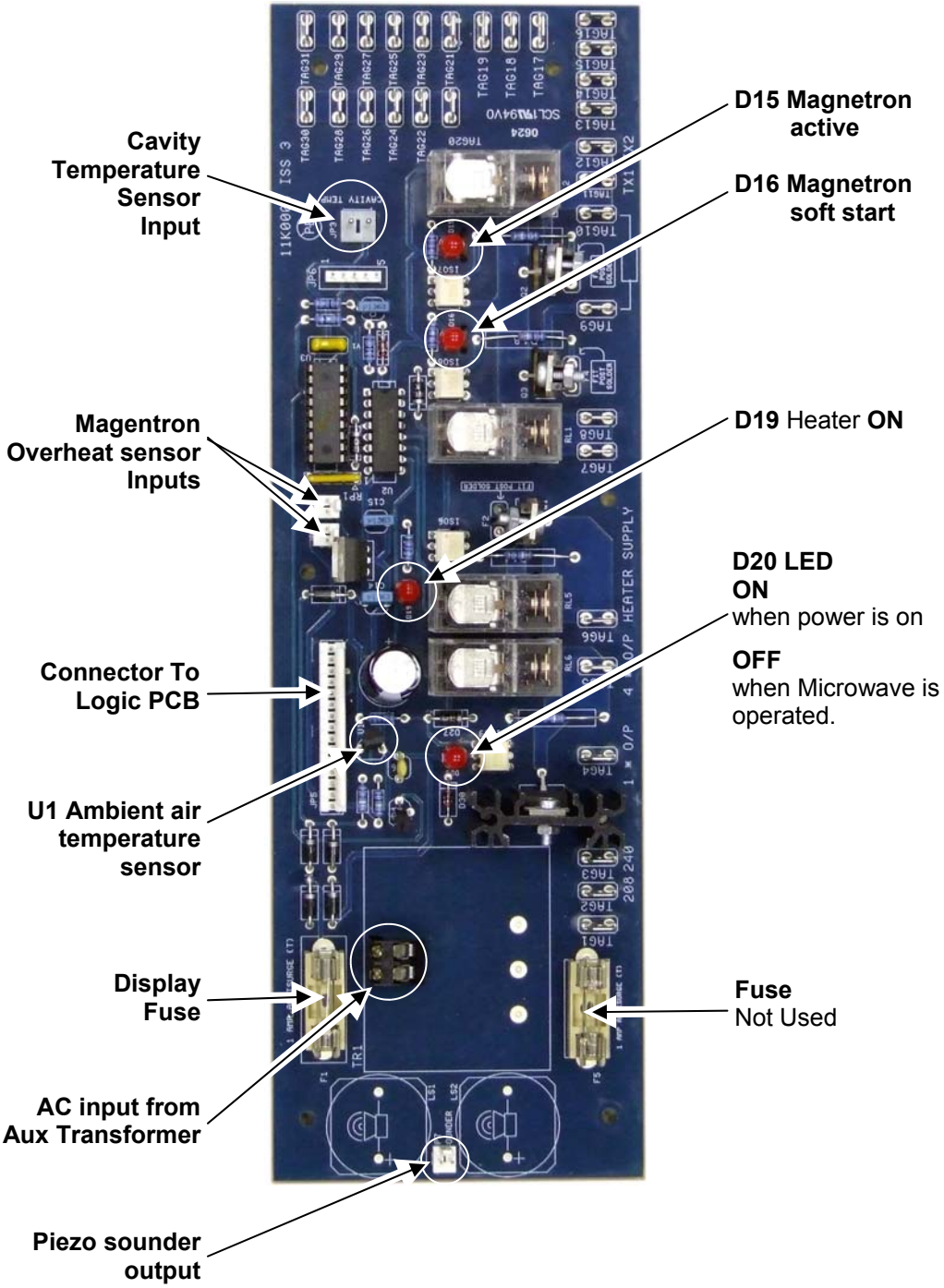
Fibre Optic Magnetron Detection


Fibre Optic Detector 2 to RHS
Fibre Optic Detector 1 to LHS
Solid State Relay Heater regulation circuit
Magnetron 1
Magnetron 2

APPENDIX 5: Relay PCB Connection Points and key features.



APPENDIX 6: Firmware revision guide.

As a result of on-going changes / upgrades to the 402s Oven, this Appendix has been produced stating the following:

1.0 An overview of the control system for a 402s.

2.0 How to check your Firmware version

3.0 How to check your hardware fitted

4.0 CODEKEY firmware upgrade

5.0 MenuKey2 download

CODEKEY Reference (See Table 1 for abbreviations description)

Version 3

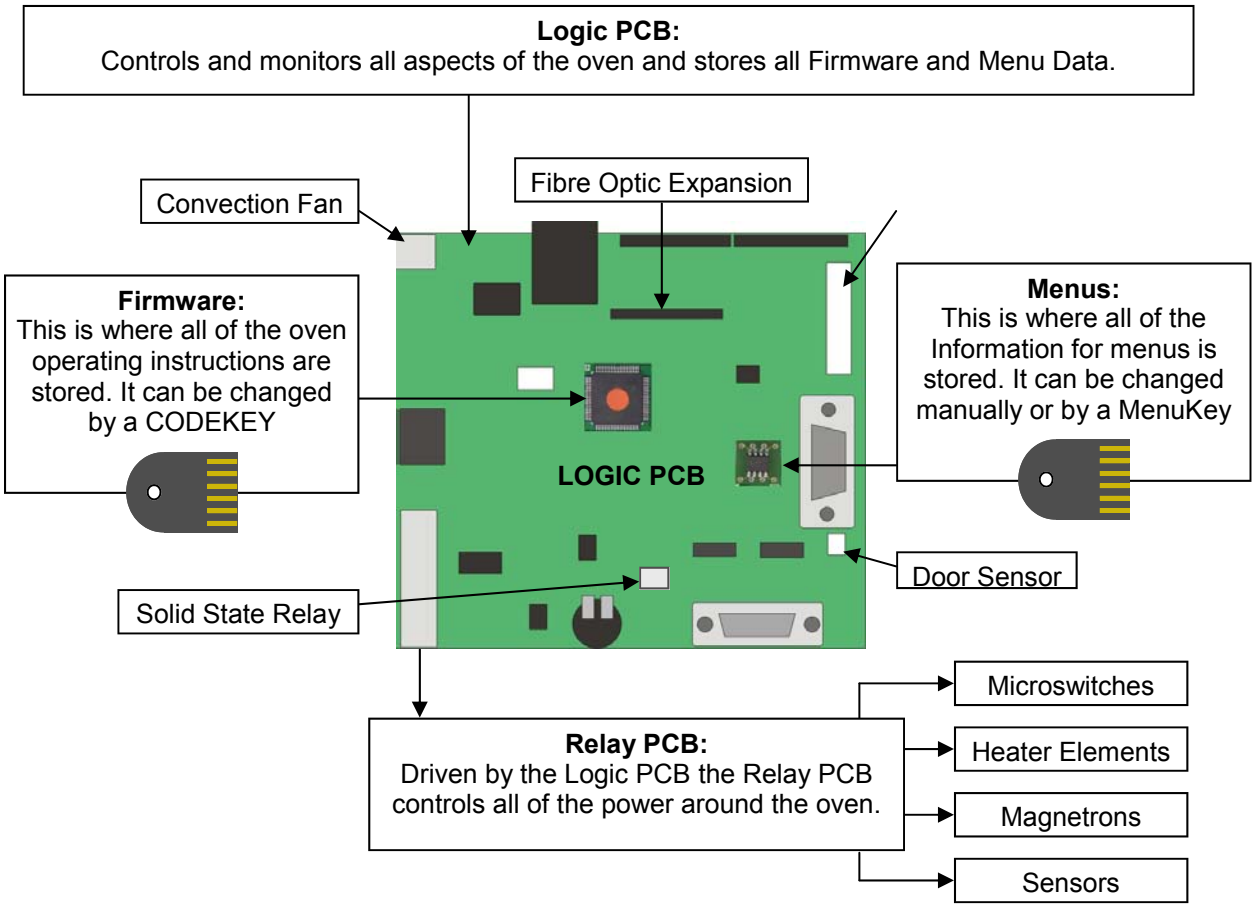
Part No. 31Z7066 3.0LD 402s Large Display UK/EU (FO / EMD)
Part No. 31Z7068 3.0LD 402s Large Display French (FO / EMD)
Part No. 31Z7071 4.3LD 402s Large Display UK/EU (FO / SSR / EMD)
Part No. 31Z7072 4.3LD 402s Large Display French (FO / SSR / EMD)
Part No. 31Z7073 4.4LD 402s Large Display US/EU
(FO / SSR / EMD / NSS / NPM / NEPT / NEP)
For QSR restaurants

Version 2.5

Part No. 31Z7067 4.4SD 402s Small Display UK/EU (FO / EMD)

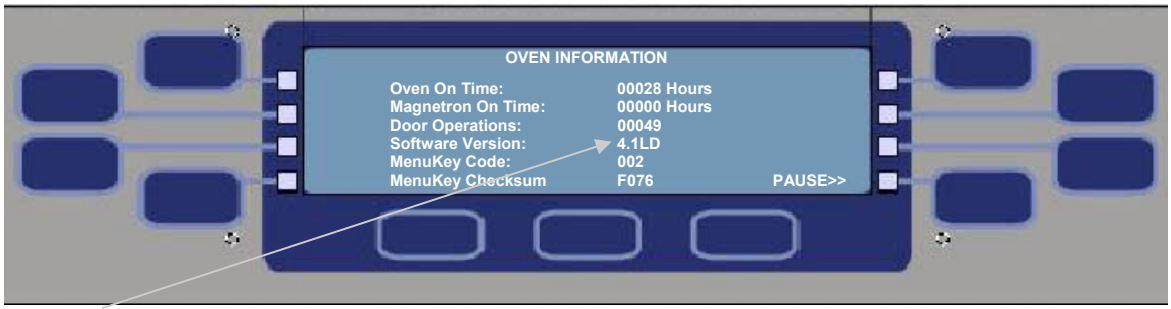
1.0 The 402s Control System

The control system of the 402s is based upon the following fundamentals:


Logic PCB:
Controls and monitors all aspects of the oven and stores all Firmware and Menu Data.
Convection Fan
Fibre Optic Expansion
Firmware:
This is where all of the oven operating instructions are stored. It can be changed by a CODEKEY
LOGIC PCB
Menus:
This is where all of the Information for menus is stored. It can be changed manually or by a MenuKey
Door Sensor
Solid State Relay
Microswitches
Heater Elements
Magnetrons
Sensors
Relay PCB:
Driven by the Logic PCB the Relay PCB controls all of the power around the oven.

2.0 How to check your Firmware Version:

2.1 Power up the oven and verify the Firmware version that is loaded into the oven.



Check the Software Version on the Oven Start Up screen and refer to Table 1 below

Firmware Verification: Table 1								
Abbreviation Code	Firmware Features Supported	Firmware Version for 402s V3 ovens						
		2.8LD or lower	3.0LD	4.0LD	4.1LD	4.2LD	4.3LD **GM**	4.4LD **QSR**
-	Screen Saver	✓	✓	✓	✓	✓	✓	✘
NSS	No Screen Saver	✘	✘	✘	✘	✘	✘	✓
-	Edit Pre-Heat	✓	✓	✓	✓	✓	✓	✘
NEPT	Hidden Edit Pre-Heat	✘	✘	✘	✘	✘	✓	✘
-	Edit Profile	✓	✓	✓	✓	✓	✓	✘
NEP	Hidden Edit Profile	✘	✘	✘	✘	✘	✓	✘
-	Edit Programs	✓	✓	✓	✓	✓	✓	✘
NPM	Hidden Edit Programs	✘	✘	✘	✘	✘	✓	✘
FO	Magnetron Detect	✘	✓*	✓	✓	✓	✓	✓
EMD	Extended Mag Detect	✘	✓	✘	✘	✘	✓	✓
SSR	Solid State Relay	✘	✘	✓	✓	✓	✓	✓
Note: this Table excludes KFC France ovens.								

*Only when Fibre Optic hardware is fitted.

Please also be aware of the store you are visiting as this would dictate what version of Firmware they would require. See below for clarification.	
CODEKEY Version 4.3LD or lower (GM ovens)	CODEKEY Version 4.4LD (QSR ovens)
All ovens except 'Quick Service Restaurants' Subway and KFC	'Quick Service Restaurants' only including Subway and KFC

Note: ALL ovens that are lower than 3.0LD Firmware should be up-lifted to version 3.0LD or higher depending on what hardware is fitted. (Refer to Table 2a & Table 2b)

3.0 How to check your hardware fitted:

3.1 Remove the oven lid to reveal the Logic PCB. See Table 2a below

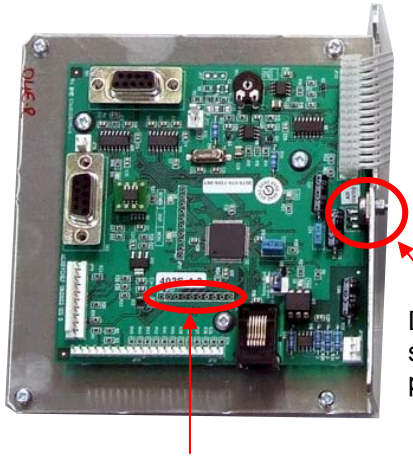
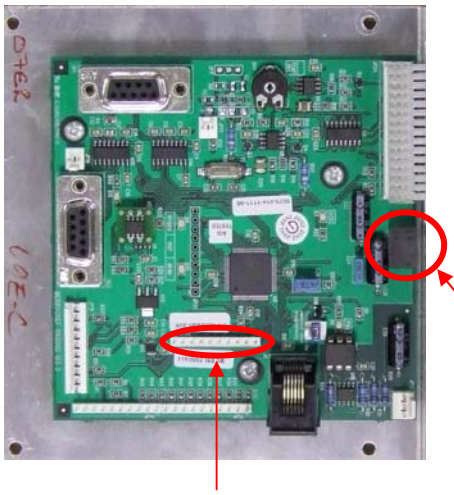
TABLE 2A PCB Visual Check	Hardware fitted against PCB visual		Supports Oven Upgrade to V3	Allowable Version / Firmware
	SSR	Mag Detect		
Revision 1  	✘	✘	✘	**ONLY ON V2 ovens** 4.4SD
Revision 2  	✘	✘	✓	**ON V2.5 ovens** 4.4SD or higher
	✘	✘	✓	**ON V3 Ovens** 3.0LD or higher

TABLE 2B Hardware Upgrade			
	Technical Bulletin Required		
Hardware Upgrade	V2 oven	V2.5 oven	V3 oven
Adding Magnetron Detect	✘	**TB114**	**TB114**
Adding Solid State Relay	✘	**TB122**	**TB122**

Revision 3

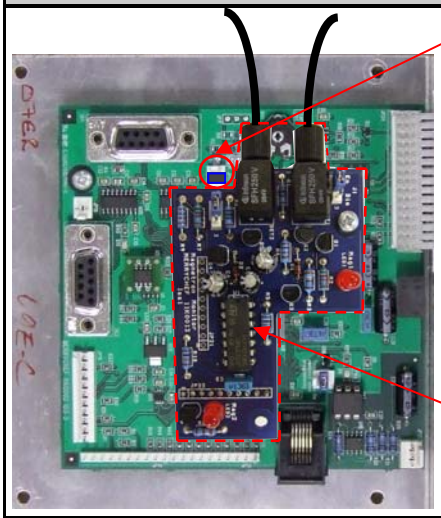
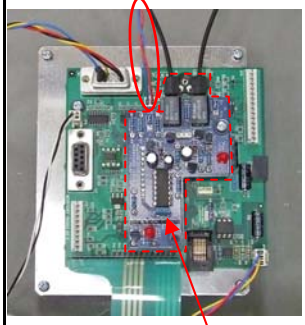
TABLE 2A PCB Visual Check	Hardware fitted against PCB visual		Supports Oven Upgrade to V3	Allowable Version / Firmware
	SSR	Mag Detect		
	✘	✓	✓	**ON V2.5 ovens** 4.4SD
	✘	✓	✓	**ON V3 ovens** 3.0LD or higher
	✓	✓	✓	**ONLY ON V3 ovens** 3.0LD or higher

TABLE 2b: Hardware Upgrade			
	Technical Bulletin Required		
Hardware Upgrade	V2 oven	V2.5 oven	V3 oven
Adding Magnetron Detect	✘	**TB114**	**TB114**
Adding Solid State Relay	✘	**TB122**	**TB122**

4.0 CODEKEY Firmware upgrade

Procedure:

Before commencing an oven Firmware upgrade ensure the oven is switched off

4.1 Insert the appropriate CODEKEY (see Matrix 01 on page 2) into the Menukey receptacle on the control panel.

Oven power switch

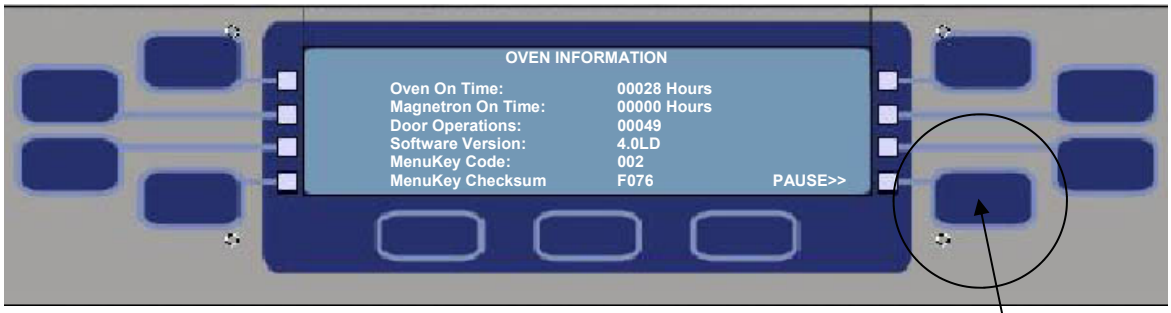
Lift cover to insert CodeKey into Menukey receptacle.

4.2

Warning: During the next step the display will be blank for approximately 1 minute. **DO NOT REMOVE THE CODEKEY/ DO NOT TURN THE OVEN OFF** this will damage the logic board.

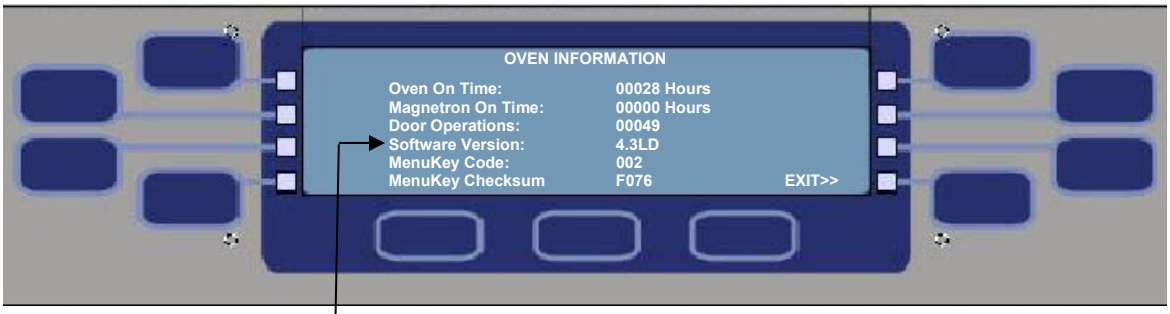
Switch the oven **ON** to activate the CodeKey, the screen will remain blank for approximately 1 minute before the startup screen displays.

After I minute the Oven will boot-up immediately press the PAUSE pad to hold the oven information screen.



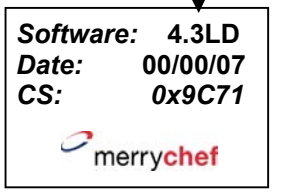
PAUSE pad

4.3 To confirm a successful download check that the Software Version on the oven and the CODEKEY fob Label are the same.



Software Version

CODEKEY Fob Label



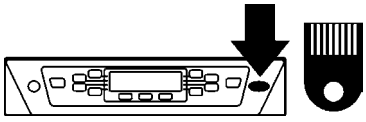
4.4 Press exit and remove and retain the CODEKEY.

5.0 MenuKey2 download

Procedure:

Before commencing a MenuKey download ensure the oven is switched OFF

1. Insert the appropriate MenuKey into the control panel socket.
2. Switch the Oven **ON**
   [DO NOT REMOVE the MenuKey as this will corrupt the data on the key]
3. The display will show the following:



MenuKey Detected Please Wait	Copying Programs from MenuKey to Oven	Verifying Programs Copied successfully	MenuKey Copied Successfully

4. The display will show the start up sequence and the Oven will begin heating up.
5. Remove the MENUKEY

APPENDIX 7: Electrical Installation Guide

WARNING

This appliance must be earthed. Failure to do so may result in electric shock and death.

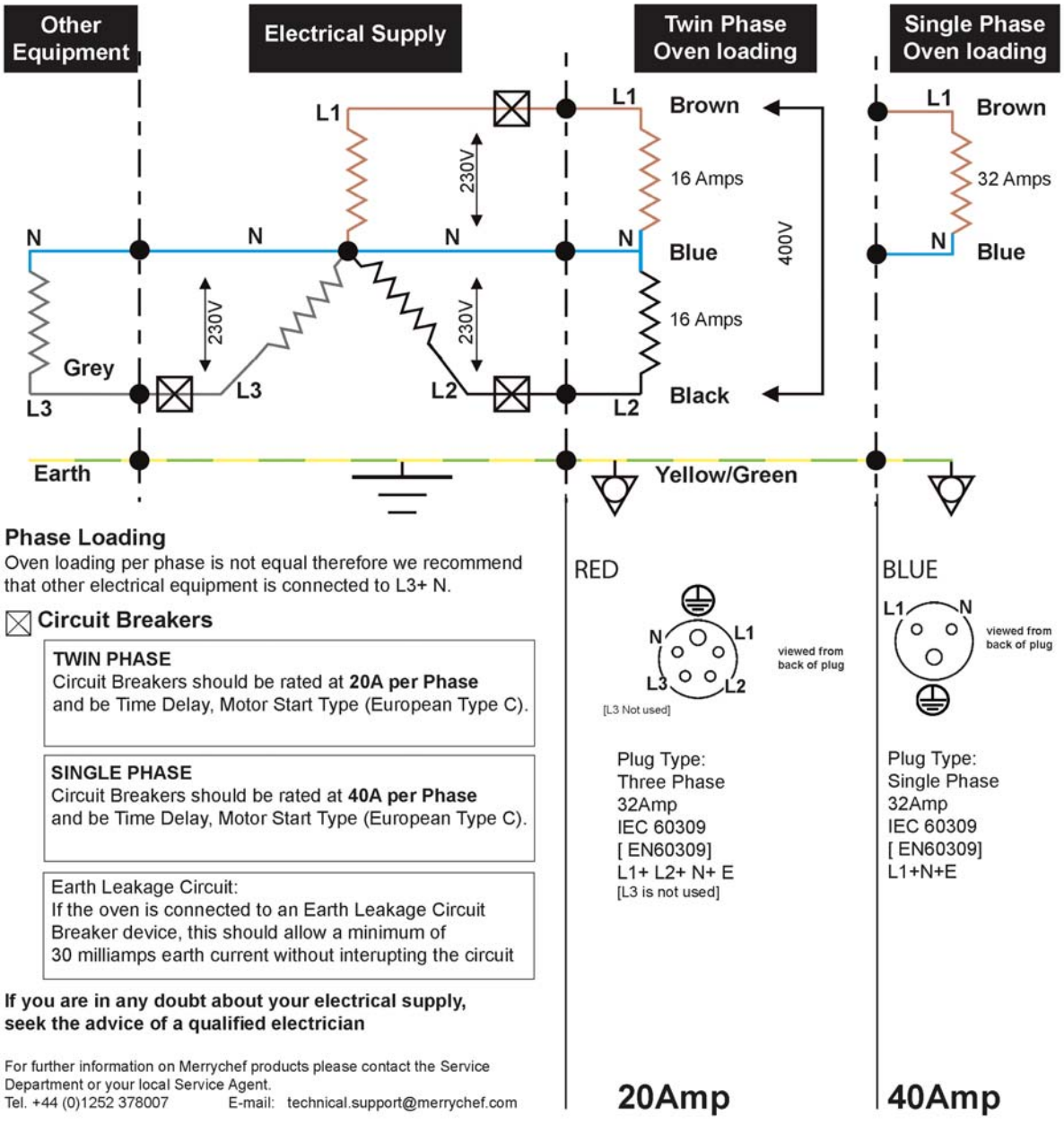
The Oven must be connected to a separate electrical supply and installed by a qualified and approved electrician. A suitably rated isolating switch with a 3mm contact gap on all poles should be fitted for each oven installed.

EQUIPOTENTIAL

An Equipotential Earth point is provided on the rear panel of the oven for independent Earth (GND) connection

WARNING: HIGH LEAKAGE CURRENT Earth connection is essential

Phase Loading Diagram



Phase Loading

Oven loading per phase is not equal therefore we recommend that other electrical equipment is connected to L3+ N.

☒ Circuit Breakers

TWIN PHASE
Circuit Breakers should be rated at **20A per Phase** and be Time Delay, Motor Start Type (European Type C).

SINGLE PHASE
Circuit Breakers should be rated at **40A per Phase** and be Time Delay, Motor Start Type (European Type C).

Earth Leakage Circuit:
If the oven is connected to an Earth Leakage Circuit Breaker device, this should allow a minimum of 30 milliamps earth current without interupting the circuit

If you are in any doubt about your electrical supply, seek the advice of a qualified electrician

For further information on Merrychef products please contact the Service Department or your local Service Agent.
Tel. +44 (0)1252 378007 E-mail: technical.support@merrychef.com

MANUAL CORRECTIONS AND MODIFICATIONS

Whilst every effort has been made to ensure that the information contained in this manual is accurate and complete, if you believe that an error has been made, or if you have any suggestions for how the manual could be improved, please fill in and return this form. A review of any forms returned will be made on a regular basis, and the manual will be updated if required.

Name
Address
Page number on which error occurs (if applicable) -
Description of error
Suggestion for improvement to manual
Please return this form to: Service Dept. Merrychef Limited, Station Road West, Ash Vale, Aldershot Hampshire GU12 5XA United Kingdom Tel: +44 (0)1252 371000 Fax: +44 (0)1252 371007 Internet address: http://www.merrychef.com E-mail: technical.support@merrychef.com